LIGHTING

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contents

Lighting Consultants

IN the Random Review of 1957, which was featured in our last issue, Mr. A. G. Penny made a reasoned plea for independent lighting specialists; or, at least, that "tied" specialists should be allowed to engage in "private practice" to a limited extent in a manner analogous to that of many medical practitioners. There is, in our view, not the slightest doubt that there should be independent lighting consultants of high standing, but it would be difficult, as matters now stand, for even a few such specialists to make a living in competition with the "free" services offered by manufacturers of lighting equipment. These services are doubtless excellent in many instances but, as Mr. Penny remarked, they are anonymous in the sense that there is no identification (so far as the user-public is concerned) of the "presiding genius" with the lightings he designs. Under this system there can be no publicly recognised "stars" in the lighting world, and Mr. Penny feels—quite rightly we think—that it would be to the advantage of users and manufacturers alike if there were some "stars," just as there are in other fields. We believe there exists an inveterate preference for personal rather than impersonal service and we hope the time is not distant when there will be "star" lighting consultants.

Notes and News

DETAILS of the programme at the IES Summer Meeting which will take place at Eastbourne from May 11 to 14 have been circulated to IES members. Non-members of the society are welcome to attend the meeting and may obtain copies of the programme from the IES Secretary, but for their information brief details of the meeting are as follows:—

Sunday, May 11

Display of lighting equipment.

Monday, May 12

Lighting trends since 1945; a survey of commercial, industrial and display lighting, by H. H. Ballin.

The design and production of glassware for lighting, by D. Shellshear and C. D. Cartwright.

Tuesday, May 13

Lighting in Finland, by E. Paivarinne.

Lighting at the Brussels International Exhibition, by Andre Boereboom.

Wednesday, May 14

Lighting and architecture, by G. Grenfell Baines and A. L. Hogg.

Character and compromise in hotel lighting, by W. R. Stevens and C. Dykes Brown.

The papers cover a fairly wide field, and practising lighting engineers should find plenty to interest them. We also hope that representatives of hotels along the South Coast will find the last paper of interest—it should certainly provide them with some ideas including, we hope, how to provide a decent light for shaving.

The programme also includes the usual social events. Unfortunately the projected visit to Glyndebourne Opera House has had to be cancelled as the Company will now be in Paris at the time of the Summer Meeting. The visit on the Tuesday afternoon will now be to Sheffield Park, near Uckfield, which is world famous for its display of rhododendrons and azaleas which should be at its best at that time. Cricket enthusiasts might like to know that it was at Sheffield Park that the first matches with the Australians were played; from 1846-96 the opening games of the Test Tour were played at Sheffield Park against Lord Sheffield's eleven. The connection with the Australian Sheffield Shield is obvious.

The technical meetings will all take place in the Winter Garden Pavilion. The headquarters will be at the Grand Hotel, but a list of other hotels may be obtained from the IES Secretary.

Colour Tolerances

The Physical Society Colour Group will hold a one-day Symposium on Colour Tolerance in the Physics Department, Imperial College, Imperial Institute Road, London, S.W.7, at 10 a.m. on Wednesday, April 2. The introductory speakers and their respective topics are as follows:

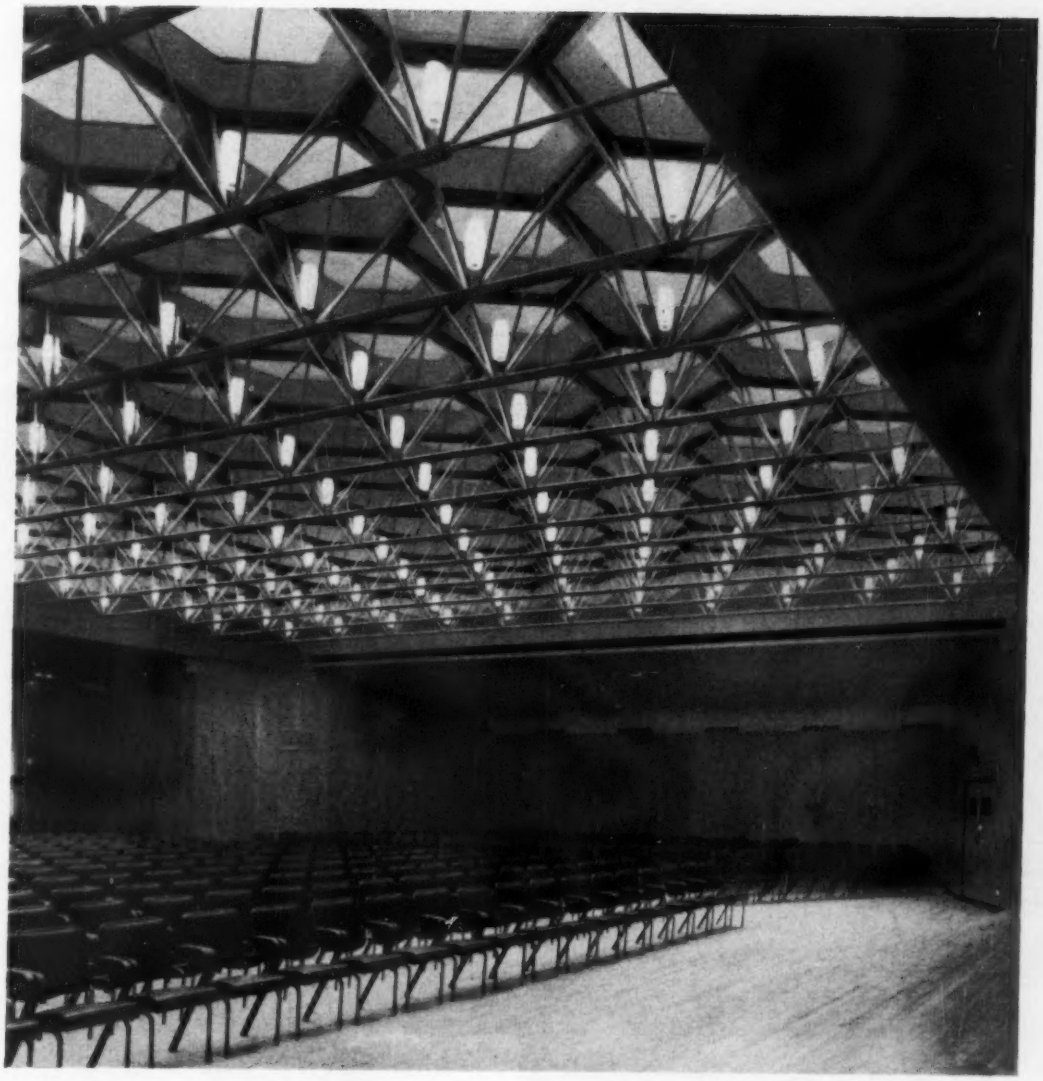
Mr. J. W. Perry: A survey of colour tolerance formulation.
Mr. A. D. Lott: Colour tolerance of printing inks.
Mr. J. S. Mudd: Colour tolerance in the leather industry.
Mr. F. L. Warburton: Colour tolerance and textiles.
Mr. P. S. Williams: Colour tolerance in paints.
Mr. J. M. Adams: Colour tolerance in the paper industry.
Mr. D. L. Medd: Colour tolerance and architecture.
Dr. J. W. Strange: Colour tolerance and lighting.
Dr. R. W. G. Hunt: Colour tolerance in colour reproduction systems.

In order to expedite the proceedings of the Symposium, preprints of all the papers will be circulated. Lunch will be available in the College Refectory at a cost of not more than 5/-.

Those wishing to avail themselves of luncheon facilities and who wish to receive preprints should inform the Hon. Secretary, Colour Group, Institute of Ophthalmology, Judd Street, London, W.C.1, enclosing a cheque or postal order for 3/- (payable to the Physical Society) to cover the cost of preprints and postage. Notification of attendance at the Symposium and requisition for preprints should if possible be sent to the Hon. Secretary of the Colour Group before March 15.

Designs of the Year

Following the successful precedent last year, the Council of Industrial Design announces that the "Designs of the Year" awards are to become an annual event and a regular feature of The Design Centre's programme. The announcement of the chosen products for 1957 and their display in The Design Centre will take place on May 8, when HRH the Duke of Edinburgh will again visit the Centre and present certificates to the manufacturers and designers of the twenty products. The selection panel appointed by the Council of Industrial Design has this year recommended that twenty outstanding designs be chosen, as against twelve last year, in order to widen the coverage of industries and prices. Only goods actually exhibited in The Design Centre during the calendar year 1957 will be eligible.



A dramatic view of the conference hall of the recently completed Trades Union Congress Memorial Building. It is lit by rows of tungsten lamps, each in a barrel-shaped opal-glass shade fixed immediately below one of the 172 hexagonal-shaped rooflights that light the hall by day. This important building is described in detail on pages 106—113.

Trades Union Congress Memorial Building

Architects, David du R. Aberdeen and Partners; partner in charge, Peter Hatton, A.R.I.B.A.; associated partner, J. S. Heathcote, A.R.I.B.A.; assistant architect, J. M. McIntosh, A.R.I.B.A.; consulting structural engineers, Ove Arup and Partners; electrical consultants, G. H. Buckle and Partners; general contractors, Sir Robert McAlpine and Sons, Ltd.; electrical contractors, Rashleigh Phipps and Co. Ltd.; lighting fittings, and equipment, A.E.I. Lamp and Lighting Co. Ltd., George Forrest and Sons, Ltd., The General Electric Co. Ltd., Holophane Ltd., Merchant Adventurers Ltd., Siemens Edison Swan Ltd., Simplex Electric Co. Ltd., Fredk. Thomas and Co., Thorn Electrical Industries Ltd., Troughton and Young (Lighting) Ltd.; switchgear, conduit, socket outlets, etc., Britmac Electrical Co. Ltd., Brockhurst Ltd., English Electric Co. Ltd., Walsall Conduits Ltd., Watford Electric and Manufacturing Co. Ltd., William White (Switchgear) Ltd.

THE new headquarters of the Trades Union Congress in Gt. Russell-street, London, W.C.1—a stone's throw from the British Museum—is one of the most important buildings to be erected in London since the war. Its architect—David du R. Aberdeen—was chosen as a result of an open architectural competition held in 1948. Construction started in 1953 and the building has been occupied in stages, as various parts were completed. The first stage was occupied in September, 1956, and total occupation took place during the latter part of 1957.

The site is small for a building of this nature, being only 180 ft. x 130 ft. in area and surrounded on three sides by narrow streets—one of them only 12 ft. wide. On the fourth side is an existing building—the central London Y.W.C.A.

The Memorial Building is mainly seven storeys high, in three blocks grouped around a central courtyard at first-floor level. In addition there are three basement levels, one of them being occupied mainly by a car park for 50 cars. The principal accommodation comprises a Memorial Hall, a conference hall, a council chamber, a suite of four committee rooms (separated by sliding/folding partitions), a training college consisting of library/reading room, lecture theatre, suite of seminars and a combined staff and students common room, offices for the secretariat, general offices, canteen, caretaker's flat and a variety of service apartments such as attendants' rooms, workshops, strong rooms, cleaners' rooms, cloakrooms and lavatories. In addition there are four floors of offices for letting situated on the second to fifth floors, inclusive, of the rear wing.

The conference hall is at basement level, its main foyer being connected by a horseshoe-shaped glass-enclosed staircase to the ground floor Memorial Hall. This latter area faces on to the courtyard, its fully glazed wall giving a view of the sculpture group by Jacob Epstein which is set against the Memorial Wall—the party wall of the adjacent Y.W.C.A. building.

Together with its foyers, circulation areas, cloakrooms, etc., the conference hall is planned to function as an entirely self-contained unit so that it may be let to outside bodies without the users having to enter the T.U.C.'s own part of the building.

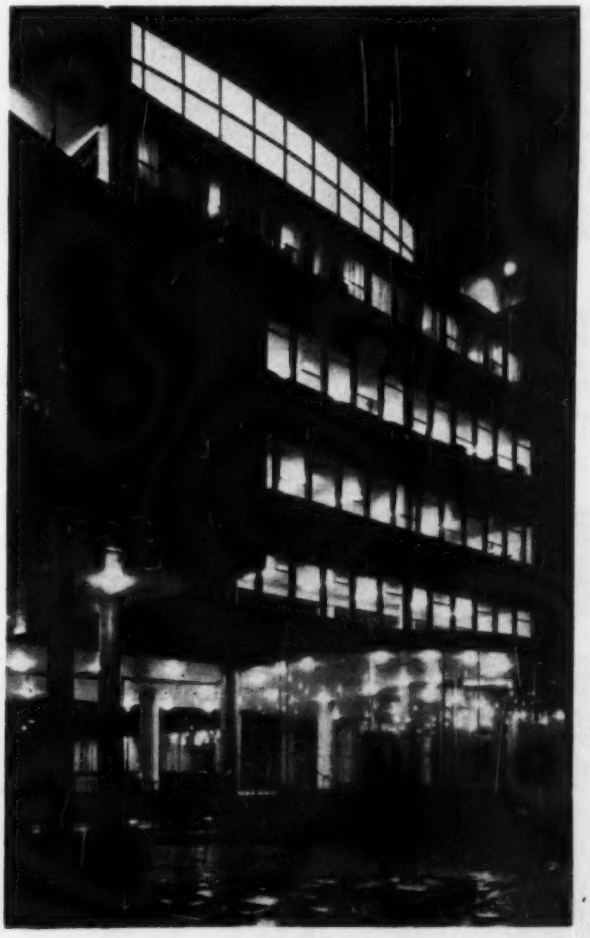
The canteen, which seats 250, is also in the basement; the training college (for 50-70 students) is in a self-contained wing, one and a half storeys high, on the first floor of the rear block; the secretariat is on the fourth floor and the committee suite on the fifth floor. Also on the fifth floor is the council chamber, while the caretaker's flat is on the top floor.

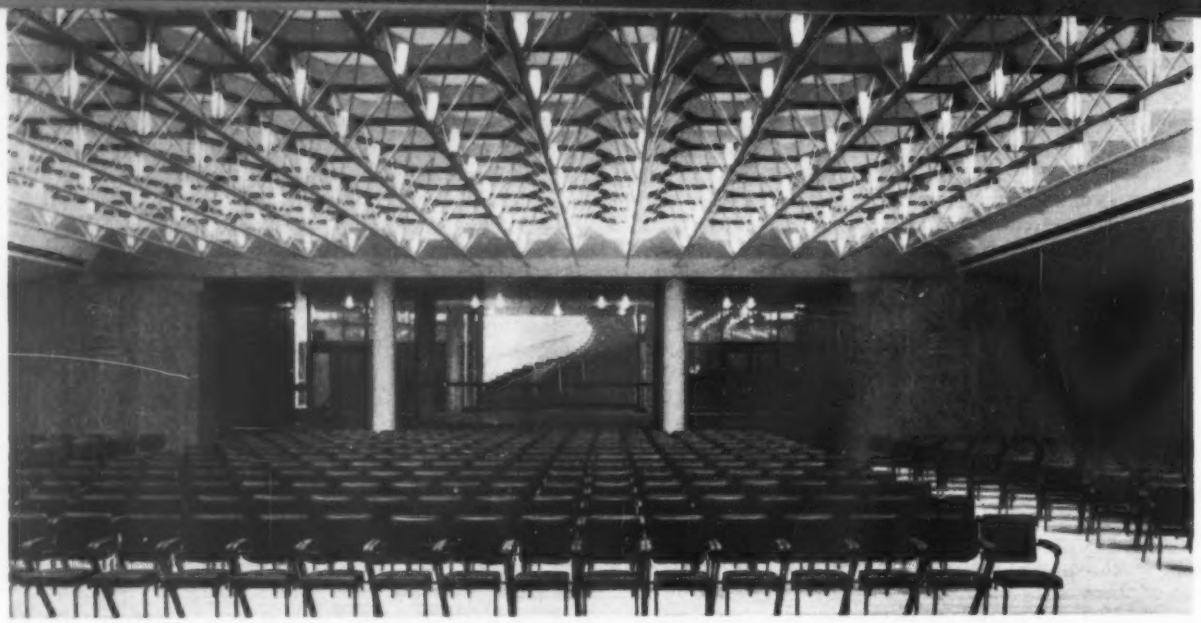
Construction

The building was constructed with a monolithic reinforced concrete frame, the reinforced concrete floors and roof having a "hollow pot" in-filling. Beams are mostly concealed in the thickness of the slab to give flat ceilings throughout, which is of particular value in the office areas where it facilitates the rearrangement of the demountable partitioning.

Vertical supports around the periphery of the building

Opposite page, general view of the elevation to Great Russell Street by day; below, similar view by night; right, night view of the Dyott Street elevation, looking towards Great Russell Street.





T.U.C. Memorial Building *(continued)*

The Memorial Hall

are at relatively close centres, slender (10 in. × 5 in.) concrete ribs between the horizontally pivoted windows taking the place of conventional columns. External cladding is mainly of 2-in. Cornish granite slabs, silver-grey in colour and polished to a " wet sheen " finish. The vertical ribs are faced with *in situ* vitreous mosaic, which is used also, in limited areas, elsewhere on the main façades. Fascias and balcony sides are of cast lead; window frames are of galvanised steel; and sills and heads are of aluminium.

Internal Finishes

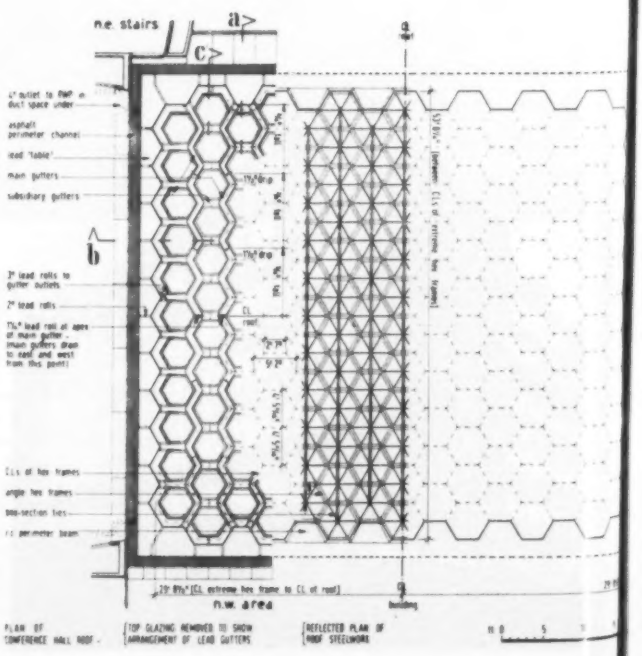
All the principal rooms are lined with hardwood panelling and veneers and have suspended plaster ceilings. In special areas, such as the lift halls, floors are of hardwood strip or blocks, while the main entrance hall has a floor of Sicilian Pearl marble. Office floors are of compressed cork tiles; the main staircase is finished with 2-in. Burma teak; and other staircases are of cast terrazzo.

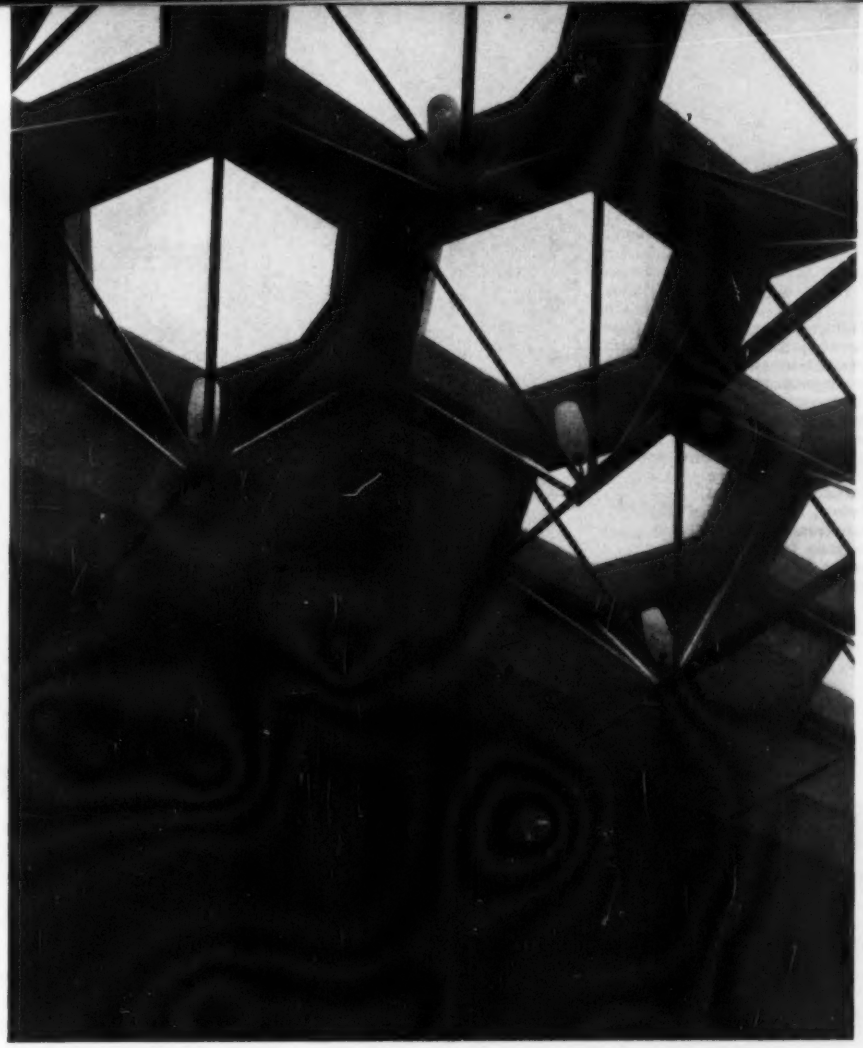
The conference hall has a fully-sprung floor of maple strip, while the foyer to it is floored with Rhodesian teak blocks. Corridors have ceilings of acoustic tiles and the rear wall of the training college lecture theatre (of British Columbian pine panelling) is slotted for sound absorption.

Heating and Ventilation

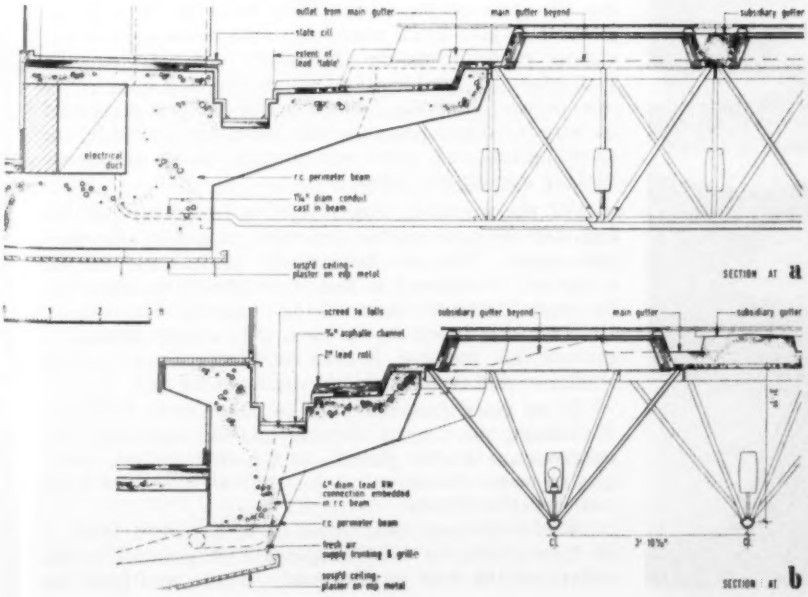
Heating is by low-pressure hot water from boilers in the basement, with radiant heating panels incorporated in the ceiling soffites or the suspended plaster ceilings. In the office areas this heating is supplemented by continuous radiator panels fixed below the window sills flush with the wall surface. Where ceiling heating is impracticable or undesirable the heating panels have been incorporated in the floors.

All the principal rooms, including the secretariat, the committee rooms and the council chamber, are fully air-conditioned, while the conference hall and most other below ground areas have full plenum mechanical ventilation. In addition, the ventilating systems of the conference hall, the council suite and the general secretary's suite are linked to the refrigeration plant for summer cooling, while there is mechanical extraction for all corridors and lavatories throughout and for the basement car park.

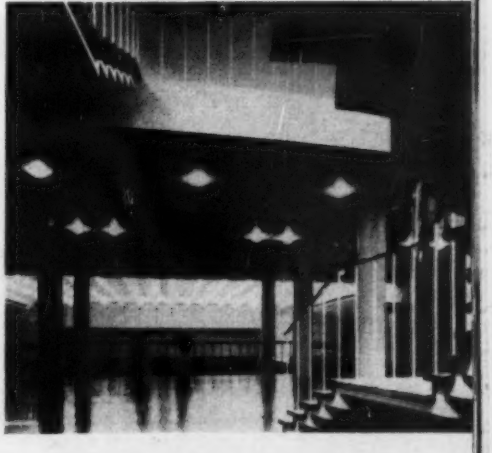


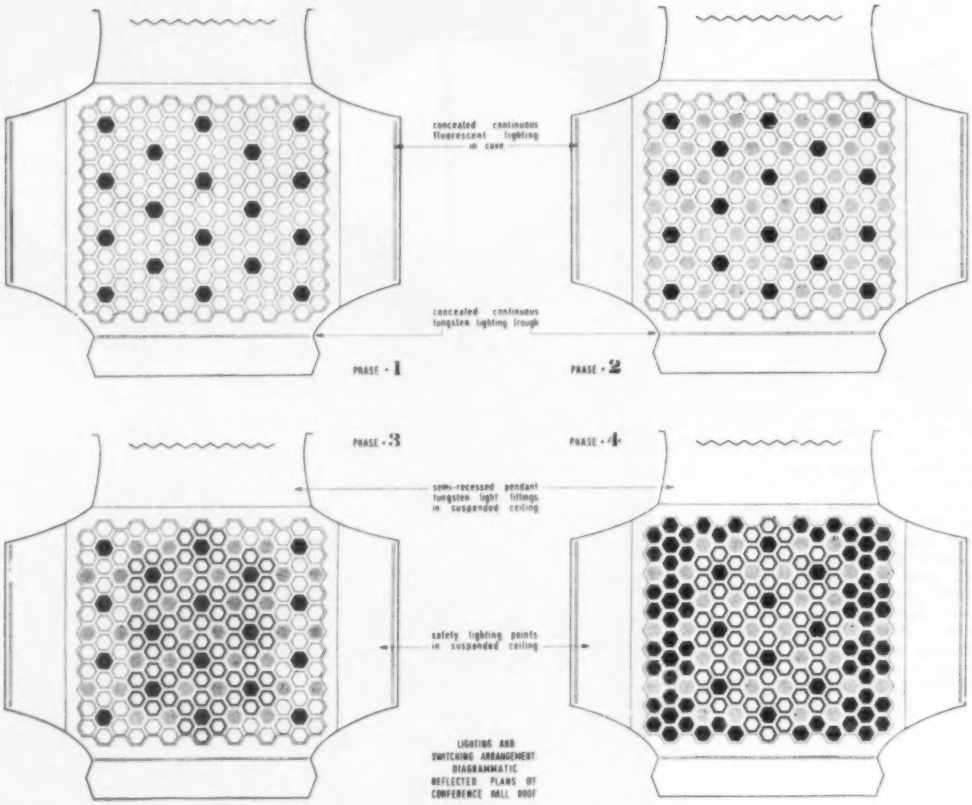


Opposite, general view of conference hall, as seen from dais, looking towards the foyer and the horse-shoe-shaped staircase leading to the Memorial Hall. The hall is lit by tungsten fittings with barrel-shaped opal-glass shades; the foyer by fully-enclosed fittings with prismatic-glass covers partly recessed into the ceiling. Right, close-up of conference hall ceiling showing how lighting fittings are fixed immediately below the centre of each hexagonal-shaped roof-light. Note the way in which the conduit feeds into the lower members of the steel space frame that supports the roof. Below, left, plan of roof showing relationship between structural steelwork and roof-lights. Below, sections through roof showing construction of rooflights and position of lighting fittings.

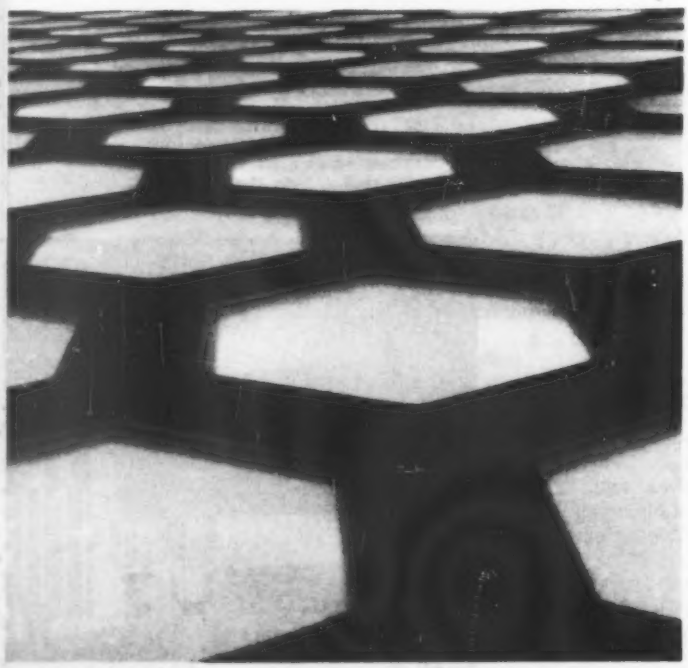


Looking across the foyer and into the conference hall from the foot of the staircase leading up to the Memorial Hall. Note the contrast in illumination levels.





Right, diagrams showing the alternative switching arrangements for the conference hall lighting. Each arrangement forms a symmetrical pattern and all lamps are dimmer controlled. Below, night view of conference hall roof as seen from the upper floors of the building.



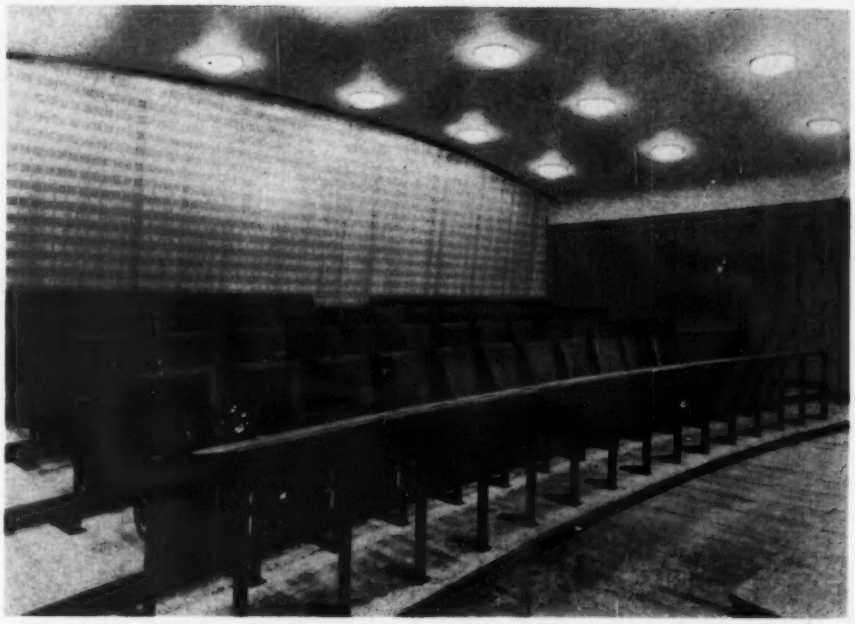
Daylighting

Because of the very restricted nature of the site and the closeness of the surrounding buildings, it was not possible to give much attention to the orientation of the various rooms from the daylighting point of view. In fact, planning considerations dominated any question of orientation. Similarly, the amount of daylight that could be introduced into any particular room was limited by the same factors and there was nothing to be gained by making daylighting calculations.

All the windows, which in most instances span the full distance between the structural supports, were purpose-made. They are horizontally pivoted and can be completely overturned so that both sides of the glass can be cleaned from the inside of the building. This type of window was chosen by the architects mainly because it can provide top and bottom ventilation in a manner similar to that provided by the double-hung sash.

In the more important areas of the building, including the library, the council chamber and the secretariat, the windows are double glazed—with patent sealed double-glazing units. Windows on the south elevation are fitted with venetian blinds.

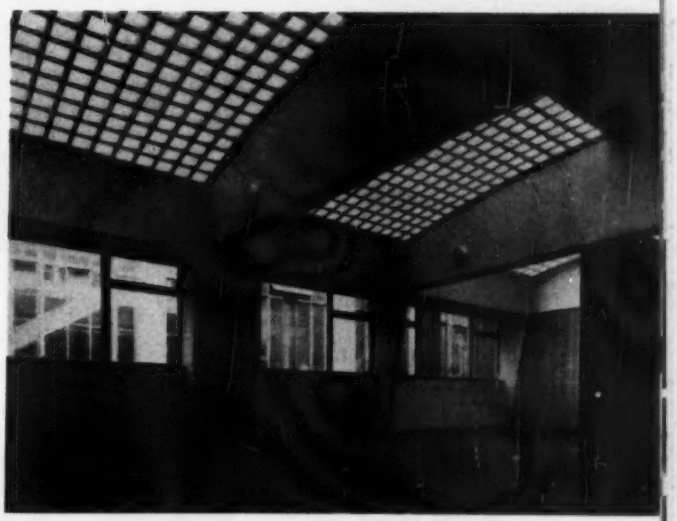
The conference hall, which is at basement level, is lit from above by 172 hexagonal rooflights set in the coffers of the steel-framed roof. These rooflights are



Left, training college lecture theatre, with fully enclosed prismatic glass fittings partly recessed into the ceiling. Below, group of seminars, lit during the day mainly from the roof-lights in the curved roof. Note the use of fully enclosed fittings with cast-glass covers on both walls and ceiling. Bottom, part of the library/reading room, with same fitting (ceiling mounted) and clerestory lighting from the balcony.

T.U.C. Memorial Building *(continued)*

Training College



triple-glazed by means of a patent sealed double-glazing unit (two sheets of ¼-in. wired plate glass with a ½-in. cavity), with an additional layer of ⅛-in. plate glass fixed about 1½ in above this unit.

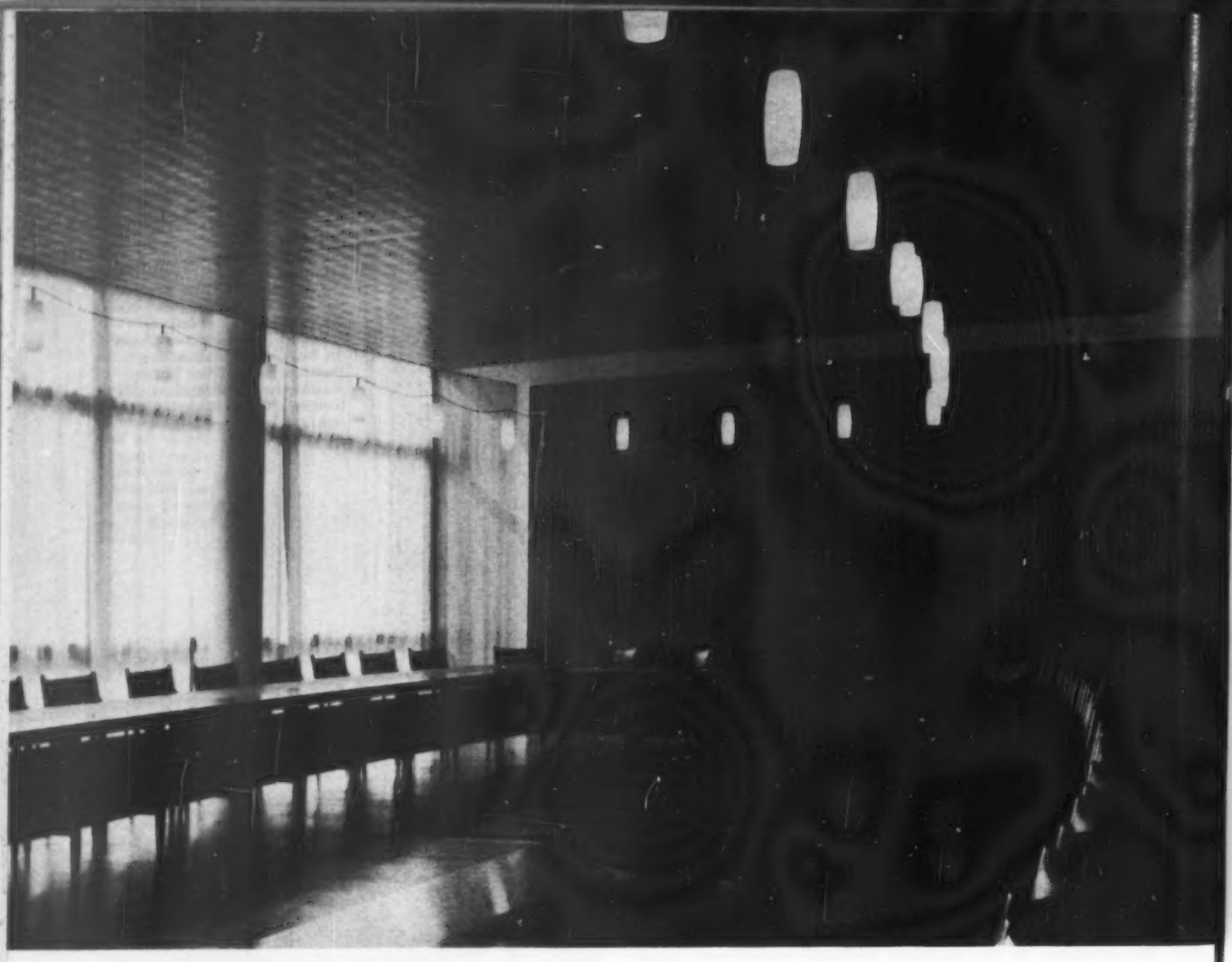
In the seminars of the training college, rooflights (consisting of 6-in. square lenses set in the curved roof) supplement the daylight from the windows which, because of the nearness of the adjacent building, would not alone give sufficient light. Corridors are lit by double-glazed clerestory windows and there is also clerestory lighting to the gallery of the library/reading room, to throw light into the centre of this large area.

Artificial Lighting

The artificial lighting of the building matches in ingenuity and sensibility the general architectural design. It was directly under the architects' control, and the architects chose all the fittings. On the other hand, full advantage was taken of the technical knowledge and skill of the electrical consultants, and all the architects' ideas were submitted to these consultants for their criticism, to ascertain their practicability and to ensure that adequate illumination levels would result.

For a building of its size and complexity there is a relatively small variety of lighting fittings—a factor which helps to create an atmosphere of cohesion. Most of the fittings are standard products or have been made or modified from standard components. Some are fully-enclosed industrial fittings, which are waterproof, dust-proof, and highly durable, though they have been used, as the principal architect put it, "in a number of ways that may have surprised their manufacturers."

The general offices are lit by ceiling-mounted fluorescent fittings of economical design, the architects having outlined their requirements and asked four firms to put



T.U.C. Memorial Building *(continued)*

Council chamber and committee rooms

forward proposals that would satisfy them. Elsewhere, most of the lighting (except where the source is concealed) is from tungsten lamps—due largely to the principal architect's personal preference. (He finds fluorescent fittings "difficult to integrate into architectural design.")

Concealed lighting, by means of fluorescent lamps, is used to light the sloping areas of suspended ceiling at the sides of the conference hall; marginal areas of the ceiling of the council chamber, where the lamps are concealed by the central area of suspended ceiling; and the surrounds to the suspended ceilings of the suite of committee rooms, where the decorative effect is heightened by "combs" of hardwood louvres which cover these illuminated surrounds.

Conference Hall

The conference hall is lit by rows of tungsten lamps in barrel-shaped opal-glass shades, there being one fitting placed centrally beneath each of the 172 glazed coffers of the roof. This lighting is dimmer controlled and is switched in four groups, each of which gives a symmetrical

Close-up of 'chandelier' used in committee rooms. It consists of six standard prismatic reflectors and a frame of steel wire. At the top of the page, the council chamber: barrel-shaped opal-glass shades are linked by flex and hung from the ceiling by piano wire. The suspended ceiling conceals fluorescent lamps that light the surround.

pattern of lamps over the area of the hall (see diagram on page 110). The four groups can be used in any combination, thus making possible 24 different arrangements, at degrees of light intensity variable according to the purpose for which the hall is being used.

The roof of the conference hall forms the floor of a central "courtyard" around which the upper floors of the building are grouped. After dark, therefore, the light from the hall illuminates this courtyard, and the patterns of light seen through the hexagonal rooflights give additional interest to the views from the upper-floor windows and the viewing balcony.

Other Areas

In the council chamber the same opal-glass shades as are used in the conference hall have been suspended (the opposite way up) in a ring following the outline of the conference table. They are hung from the timber ceiling by piano wire, while the flex that links them is allowed to fall in graceful loops as part of the decorative effect. The same type of shade is used also in the library/reading room of the training college.

In the committee room suite there are a number of "chandeliers"—one to each room—specially made to the architects' design. Each chandelier consists of six standard prismatic reflectors connected by a construction of steel wire and hung from the ceiling by piano wire.

Most other areas, including the training college lecture theatre, the foyers to the conference hall, the viewing balcony overlooking the conference hall roof and the basement dining room, are lit by standard fully enclosed fittings with prismatic-glass covers, which are partly recessed into the ceilings so that only part of the glass cover protrudes below the soffit.

Elsewhere—for the main lighting of the training college library/reading room and for the staircases, corridors and circulation areas—an economical tungsten fitting, circular in shape, with a stove-enamelled metal casing and a cast-glass cover, has been used—either ceiling mounted or fixed to the wall.

Finally, the underside of the canopy over the entrance to the conference hall foyer is lit by rows of industrial bulkhead fittings which give an attractive flood of light at this point.

Top, general view of committee room suite, with sliding/folding partitions opened. Above, general offices in the rear wing. Left, viewing balcony overlooking the roof of the conference hall, the Memorial Hall and the sculpture group by Jacob Epstein. Industrial type fittings are recessed into the canopy.

Main production area.

Factory and Offices at Camberley, Surrey

Architect, John Bickerdike, ARIBA; assistant architect, P. J. A. Gower, ARIBA; structural consultant, F. G. Coffin, AMIStructE.

ON a flat and virtually treeless site, 2½ acres in extent, this factory has been built for Sharples Centrifuges Ltd., manufacturers of high-speed centrifuges. The adjacent office block is separate from the factory building to comply with Board of Trade regulations, and both buildings have been sited to allow for future extensions.

The Factory

The factory comprises an engineering bay, for both light and heavy machines, a pilot plant area, and a laboratory. It is constructed of steel portal frames, of 50-ft. clear span, at 16-ft. 8-in. centres, each frame being designed to carry a two-ton point load. The roof is of insulated aluminium decking covered with three-ply bituminous felt. Walls are of cavity brickwork, with the inner skin of sand-lime bricks (unpainted), while the north wall is of temporary construction, as it is in this direction that the building would be extended.

The low-pitch north light is of aluminium patent glazing, while the clerestory windows, which include opening lights, are of galvanized steel. The floor has a granolithic finish. Heating is by means of a horizontal oil-fired boiler of the semi-automatic "packaged" type. It is situated in the factory area, the burner being particularly quiet in operation. This heating plant also serves the office block and could be used, in addition, for raising steam for experimental work.

The Offices

The office block is planned to provide the maximum of usable office space, corridors and stairs occupying only 4½ per cent. of the total area. The building houses a staff of 60, with the general offices, typists, filing area and canteen on the ground floor and the executive offices, secretaries, drawing office and library/conference room on the first floor, which is more quiet.

Construction comprises a steel frame on a 16-ft. 8-in. x 13-ft. 4-in. grid, with floors and roof of precast concrete beams with an in-filling of foamed-slag blocks. Steel edge channels support external cladding, which consists of timber-framed curtain walling with softwood mullions at 3-ft. 4-in. centres.

Partitions are of 3-in.-thick precast gypsum-plaster panels, which are removable, but because of their weight

give better sound insulation between the offices than would be given by partitions of the fully demountable type. The roof finish is three-ply bituminous felt with spar-chip topping ; the floor finish is mainly thermoplastic tiles (using a " greaseproof " quality in the canteen and kitchen) ; and the ceilings throughout are of ½-in. asbestos-composition panels.

Heating (by hot water supplied from the factory boiler) is mainly by continuous rows of finned pipes, with radiators in the lavatories and a fan-operated heater " cabinet " giving convected warm air in the reception area.

Daylighting

The office block is a U-shaped building enclosing a small courtyard, approximately 25 ft. by 30 ft. in area, which assists substantially in giving good natural light to all the offices. The principal offices face roughly south, while the drawing office and the library/conference room each have windows on three sides. The timber-framed curtain walling, which was designed by the architect, provides plenty of daylight to all areas of the office block, and daylighting calculations were not needed. Opening lights are centre-pivoted and were purpose-made, while all south-facing windows are fitted with venetian blinds.

The factory is lit during the day by north light glazing, the pitch of which is only 35 deg., instead of the more usual 60 deg. This gives a more efficient utilisation of the glass area, while permitting only small amounts of direct sunlight to penetrate the factory. The daylight from the roof glazing is supplemented by a continuous clerestory along the south wall.

Artificial Lighting

As with the general design of the buildings, the artificial lighting scheme was developed with economy in first costs as one of the primary considerations. For this reason, tungsten fittings were chosen for the offices, the actual fitting being of neat design and capable of being used at close centres (to give high illumination levels) without giving the rooms an unsightly appearance. In the general offices the illumination level aimed at was about 20 lm/ft², while in the drawing office, where the same fittings are used at closer centres, the level is between 30 and 35 lm/ft². The fittings are made of plastic, with plastic louvres, and mostly house 150-watt g.s. lamps. They have a 45-deg. cut-off and give a good spread of light on the ceiling.

In the conference room there are 10 tungsten fittings,

Top, general view from the east; centre, library/conference room; right, general office.

with perforated cone-shaped shades, fixed directly to the ceiling. Over the table are three foreign fittings—also ceiling-mounted—each with an open-bottomed inner shade of opal glass and an open-bottomed outer shade of clear glass with a spiral pattern etched into its surface.

The entrance hall is lit by downlights (with specular reflectors and aluminium louvres) recessed into the ceiling, while adjustable spotlights with perforated spun-aluminium shades shine on to a display area.

In the factory the artificial lighting comprises simply rows of low-price fluorescent batten fittings clipped directly to the purlins, which were made from channel section steel for this purpose. The portal frames were perforated during manufacture so that the conduit could be passed through them without cutting. The mounting height is about 20 ft. and an illumination level of about 25 lm/ft^2 has been achieved by an installed load of under 1 watt/sq. ft.

Installation

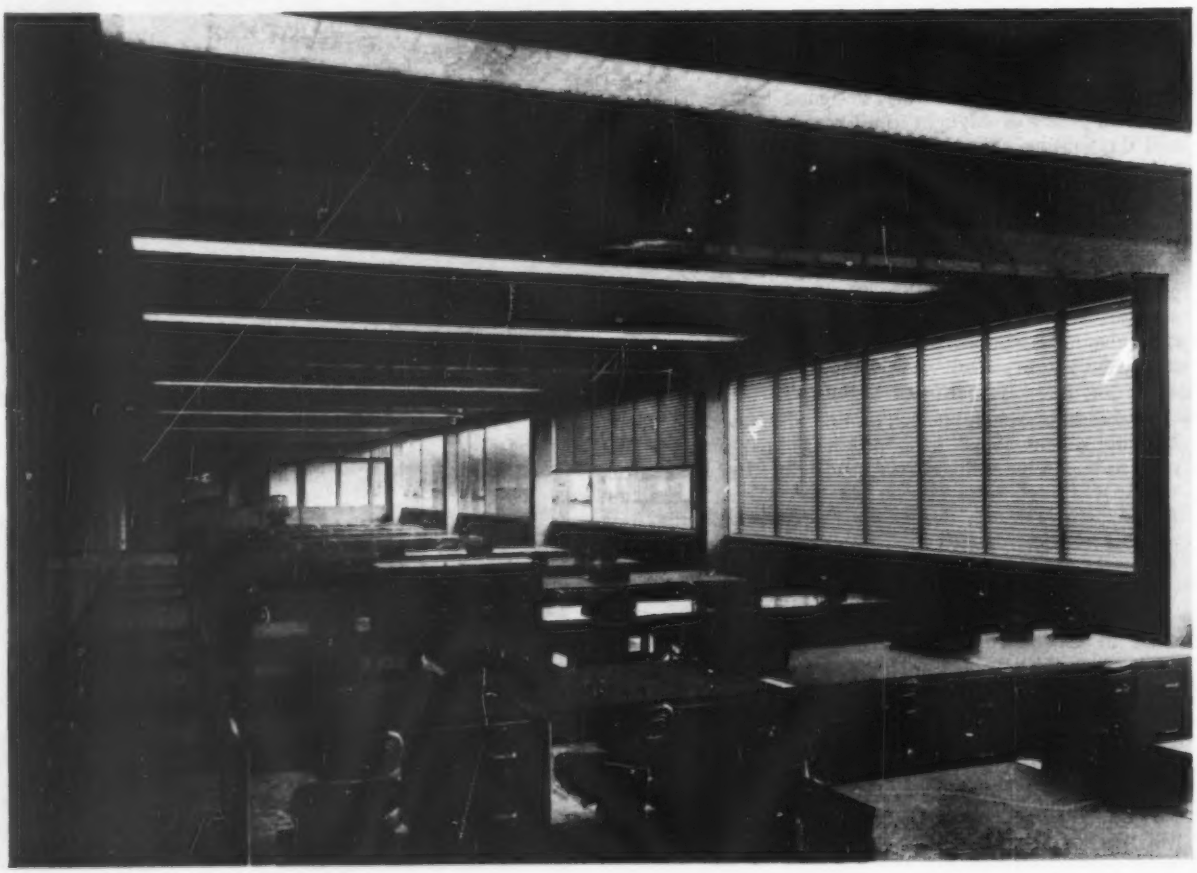
The electrical installation comprises a 415-volt, 3-phase/250kVA power supply in the factory, with 300-, 100-, 60-, 30- and 15-amp switch fuses. "Pyrotenax" cable carries current to the offices, where it is distributed via 3-pin 13-amp socket outlets.

General contractors were J. M. Jones and Sons (Builders), Ltd.; the electrical installation was carried out by Edmundsons Construction Co., Ltd.; and lighting fittings were supplied by Courtney, Pope (Electrical) Ltd., Ekco-Ensign Electric Ltd., the General Electric Co. Ltd., and Merchant Adventurers Ltd.

Offices near Birmingham

Architects, Leonard J. Multon and Partner, F./F.R.I.B.A.; general contractor, C. Bryant and Sons Ltd.; electrical installation, Baxter and Impey Ltd.; lighting fittings supplied by Best and Lloyd Ltd., A.E.I. Lamp and Lighting Co. Ltd., Harris and Sheldon (Electrical) Ltd.

General office, with power-operated venetian blinds to the south-facing windows and artificial lighting from 'luminous beams.'



THIS two-storey office and warehouse building near Birmingham was designed by Leonard J. Multon and Partner, F./F.R.I.B.A., not only to accommodate comfortably and efficiently the client's administrative staff, but also to reflect the progressive nature of the company —Charles Churchill and Co., Ltd.—and the quality of its product—top-grade machine tools. The building faces south on to a main road, from which passers-by can see into the striking and well-lit entrance hall.

The entrance doors and surround are fully glazed and all the main offices, which are on the principal (south) elevation, have windows that occupy the full width between the vertical members of the structural frame. There is a minimum of glazing bars—sufficient only to provide enough opening lights—and all windows are fitted with electrically-operated venetian blinds, there being one large unit to each window.

Accommodation

The accommodation comprises general offices, warehouse and showroom; a reception hall and waiting-room; and an executive suite consisting of managing-director's office, board-room and waiting-room. The entrance hall rises the full height of the building, the staircase wall being covered with red-and-white plastic leathercloth in a Harlequin pattern. Internal supports have been kept to a minimum—there are no columns whatsoever in the general office area—and most partitions are part-glazed and demountable.

Finishes

Floor finishes are as follows : thermoplastic tiles in the offices; carpet, with teak surround, in the executive suite; teak strip in the corridor of the executive suite; and Carrara marble tiles in the entrance hall. Walls are mostly finished with hard plaster, with rosewood and sycamore panelling in the board-room and managing-director's office and Serpentine marble for one wall of the entrance hall. Suspended ceilings are, in most areas, of perforated metal pans which assist in sound absorption and act also as radiant panels for the ceiling heating system.

Lighting

Particular attention was paid to the artificial lighting of the building, one of the architect's main aims being to avoid the use of visible light sources. The general offices are lit by ' luminous beams '—' Luve-tile ' panels set flush with the ceiling concealing lines of fluorescent lamps.

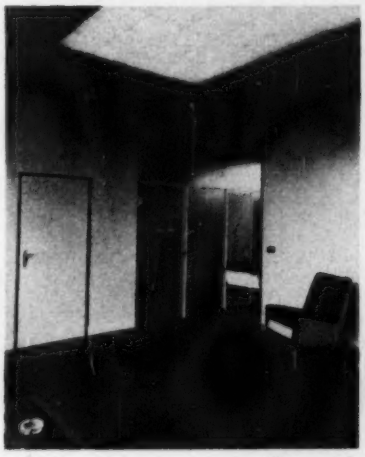
The ' beams ' are 18 ft. long (in a room 23 ft. wide) and are set at 9-ft. centres. The illumination level is about 15 lm/ft^2, the light being very evenly distributed. Control gear is remote from the lamps. It is located to one side of the building, above the suspended ceiling, the acoustic panels of which are easily removed for maintenance.

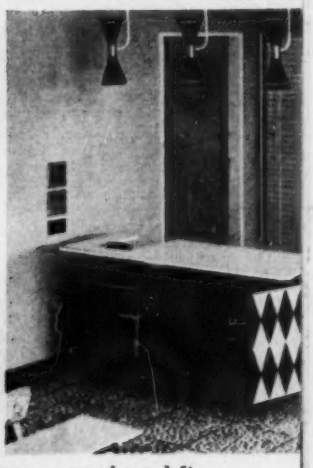
Executive offices are lit by centrally located ' Luve-tile ' panels concealing fluorescent lamps, the panel, in each instance, being 8 ft. x 5 ft. in area (in a room 18 ft. square) and set flush with the ceiling.

The board room is lit indirectly by fluorescent lamps housed in a series of fibrous-plaster troughs, sparkle being provided by a row of diabolo-shaped wall-lights fixed to the wall facing the windows.

Corridors, lit naturally by clerestory windows, are lit after dark by a row of fluorescent lamps concealed by the sill of the clerestory, with the result that the appearance by night closely resembles the appearance by day. In the entrance hall, too, the main artificial lighting is arranged to come from the same direction as the natural lighting, and lines of fluorescent lamps have been installed above the plate-glass entrance doors, where they are covered by two layers of glass—one opal and one reeded—to give adequate diffusion. Additional, directional, light comes from 24 100-watt tungsten lamps in recessed circular ceiling fittings. Each fitting has a white spun-aluminium reflector and each lamp is covered by an aluminium diffuser with a gold anodised finish. Three diabolo-shaped fittings in matt gold and black, each housing two tungsten lamps, are suspended over the reception desk to give a greater intensity of light at this point.

The waiting-room of the executive suite is treated in the same way as the executive offices, there being a rectangular ' Luve-tile ' panel set flush with the acoustic ceiling. Above are rows of fluorescent lamps.





Top, conference room; above, left, waiting room in executive suite; above, right, reception desk in entrance hall.

General view of auditorium, with decorative shutters partly withdrawn.

New premises for

The National Film Theatre

Designed by the L.C.C.'s Architect's Department, in conjunction with the Planning and Design Department, G.B.-Kalee Ltd. Architect to the Council, Hubert Bennett, F.R.I.B.A.; deputy architect, F. G. West, A.R.I.B.A.; senior architect (General Division), D. C. H. Jenkin, F.R.I.B.A.; assistant senior architect, K. J. Campbell, A.R.I.B.A.; project architects, Norman Engleback, A.R.I.B.A., John Roebuck, A.R.I.B.A., and Robin Kirton; electrical consultant, J. Rawlinson, C.B.E., M.Eng., M.I.C.E., M.I.Mech.E., Chief Engineer, London County Council; electrical installation and lighting fittings, Troughton and Young Ltd.

THE new National Film Theatre replaces the temporary cinema which the British Film Institute has been using since 1951—the "Telekinema" of the Festival of Britain South Bank Exhibition. The new premises, which provide seating for 504 people—100 more than the old theatre, are situated under the southern abutment of Waterloo Bridge, where they will form part of a group of buildings planned to occupy the river front between this bridge and Westminster Bridge, all of which will be devoted to music and the visual arts. The cost of the theatre, excluding the cinematographic equipment, was approximately £70,000, and it was built in nine months.

In addition to the auditorium, the entrance hall and the foyer, there is a suite of rooms to the right of the auditorium comprising lounge and coffee bar for associate members of the B.F.I. and a cocktail bar and clubroom for full members. This clubroom serves also as a conference room and a retiring room.

To the left of the auditorium are the public toilets, administrative offices, stores, etc. Above the foyer, reached by a spiral staircase, is a small viewing theatre

Right, coffee lounge; centre, bar for full members of the British Film Institute; bottom, clubroom/conference room.

for 15 people and the projection room, the latter being situated between the auditorium and the viewing theatre so that it can serve both. The projection equipment is said to make the theatre the most up to date in the world. There are four projectors for 35 mm. films and two for 16 mm., and the equipment makes possible the showing of every type of film from the oldest silent films to "CinemaScope," with no less than ten different screen ratios. Provision is made also for back projection (through the viewing theatre) on to an outdoor screen over the entrance which will be used for publicity purposes.

Seating in the auditorium is arranged to ensure a good view of the screen for every member of the audience, the viewing distance having been kept within narrow limits (24 ft. in the front row and 64 ft. in the back row). The widest angle of vision does not exceed 115 deg.

An unusual feature of the auditorium is the absence of a stage or proscenium, the screen being suspended from the roof in a manner that makes a distinct break with the theatrical tradition that has so long persisted in cinema design. A decorative shutter consisting of 342 irregularly-shaped plywood panels with a roughly-textured gilt finish covers the screen when it is not in use. This shutter is in two halves which are transported mechanically to the rear of the screen during performances.

Lighting

There is virtually no natural lighting in the building, the only external glazing being the fully-glazed entrance doors and a glass wall to the clubroom/conference room.

In designing the artificial lighting the architect avoided the use of conventional lighting fittings, preferring to use both tungsten and fluorescent sources of light built into the structure to provide planes and points of light which would heighten the various decorative effects at which he aimed.

The auditorium is lit mainly by 150-watt mirror spotlights recessed into the ceiling in a regular pattern. Each lamp is housed in a matt-black asbestos tube which stops the light from spreading over the ceiling surface. In addition there is decorative lighting from rows of 25-watt tungsten lamps concealed behind the screen walls that cover the structural elements of the bridge. These lamps are at 6-in. centres along the top of the screen and 9-in. centres along the bottom, and the light "spills" on to the ceiling and the floor, respectively. Secondary lighting is from 12-volt g.s. lamps recessed into the ceiling.

The entrance hall of the building in brilliantly lit by rows of fluorescent lamps above a metal eggcrate ceiling, the louvres being covered by a diffusing membrane of glass fibre. Immediately one leaves the entrance, however, there is a dramatic reduction in the illumination level and the lighting becomes directional instead of diffuse. In the foyer, 150-watt mirror spotlights, again housed in matt-black tubes, are recessed into the ceiling, which, because it is painted black, makes this area appear even darker than it really is. Two 2-ft. fluorescent lamps concealed by the upright members of the framing provide

extra light for the box office, while adjustable spotlights shine on poster displays on the foyer walls.

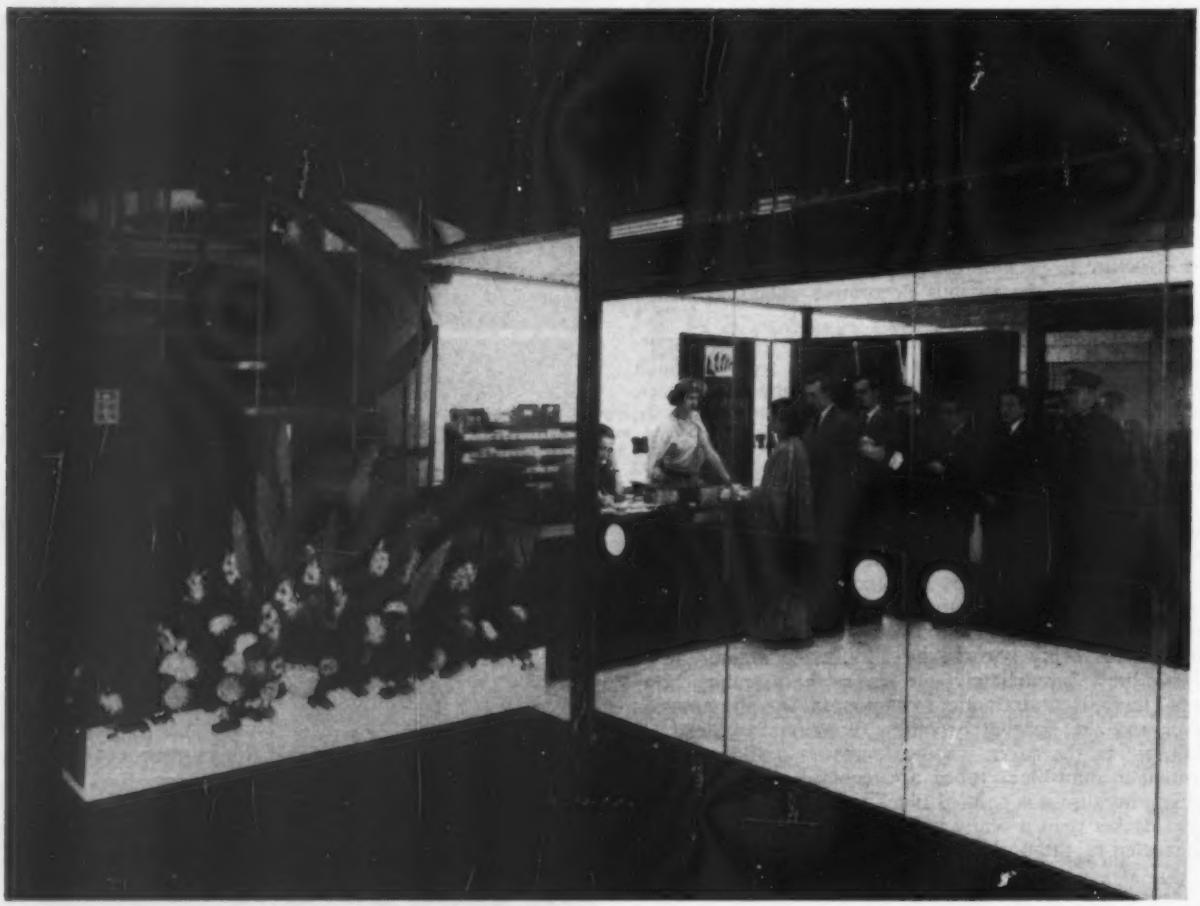
The lounge is lit by more reflector spotlights (150-watt and 75-watt) in tubular housings. Arranged in a cluster and at various angles to the ceiling surface, the housings are mitred so that the apertures in the soffit are oval in shape. Extra light comes from the built-in lighting of the showcases.

In the two bars there is fluorescent lighting, with one lamp recessed into a gap in the fibrous-plaster ceiling immediately over the bar counter and two more lamps, covered by reeded glass, set in recesses on either side. The lamps are the "3500K" variety, which do not distort the colours of tea and coffee or "kill" the very dark blue used in the decorations of these areas.

The rear of the members' bar, serving also as a passage to the clubroom, is lit by a specially designed fitting comprising a rectangular pressed metal tray or canopy, off white in colour, suspended from which are several small metal trays containing 2-ft. fluorescent lamps that shine on to the canopy. A similar but larger fitting is used in the clubroom/conference room, where it serves to introduce a rectangular element into an area which, because of the many structural obstructions, contains virtually no right angles.

The small viewing theatre is lit by louvred downlights recessed into the ceiling, while the projection room is lit by ceiling-mounted bulkhead fittings.

Above, the small preview theatre situated adjacent to the projection room. Below, the entrance hall, as seen from the foyer. Brilliant lighting, intensified by the white marble floor, serves to draw attention to the inconspicuous entrance.



THE 'FRIAR TUCK' NEW COVENTRY STREET LONDON WI

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Lighting Abstracts

OPTICS AND PHOTOMETRY

535.24

542. IES guide for photometric measurements of fluorescent lamps.

Illum. Engng., **52**, 538-542 (*Oct.*, 1957).

Prepared by the Sub-Committee on Photometric Testing of Fluorescent Lamps of the American IES, this Guide deals with the measurement of total luminous flux, directional luminous intensity and colour of fluorescent lamps. Ambient temperature and freedom from draughts are both critical. The lamps need to be operated in conjunction with reference ballasts of appropriate rating and measurements should be made only after an adequate stabilisation time. Photoemissive and barrier-layer cells are generally used for both total luminous flux and luminous intensity measurements. Colour appearance should be measured with either a spectroradiometer or a Barnes-type (multi-photocell) colorimeter. Adjustment of the latter type of colorimeter is dealt with at length. P. P.

535.245

543. A brightness attachment to the AEG illumination photometer.

H. BUCHBINDER and G. ECKHARDT, *Lichttechnik*, **9**, 550-1 (*Nov.*, 1957). *In German.*

Two attachments are described. That for measuring the luminance of an extended illuminated surface consists of a lens attachment which forms an image of the surface on the photocell of the photometer. For light sources the attachment consists of a box fitted over the photocell, the end opposite the cell having a small opening of known area in relation to its distance from the cell. J. W. T. W.

544. Range of signal lights. 928.975

K. GROSSKURTH, *Lichttechnik*, **9**, 551-4 (*Nov.*, 1957). *In German.*

The author describes the results of a number of researches on the visibility of a signal light and its dependence on the illumination it produces at the observer's eye. This is the governing factor for signals small enough to be regarded as point sources. For larger signals the luminance of the signal becomes more and more important. A number of formulae are derived from the experimental results obtained by various workers. The effect of background luminance, in the case of signals viewed by day, and the influence of atmospheric absorption are taken into consideration. J. W. T. W.

545. Effective intensity of flashing lights. 612.843.5

T. H. PROJECTOR, *Illum. Engng.*, **52**, 630-640 (*Dec.*, 1957).

Flashing lights are widely used as signals, markers and warnings in sea and air navigation and in road traffic control. For design purposes, the need to specify the effective intensities of these flashing lights is met by expressing them in terms of the equivalent intensities of a steady light. The classical work of Blondel and Rey in 1911 on this subject has since been supplemented by numerous further studies, including those by Long, Toulmin-Smith and Green, Hampton and Schuil on non-square waveforms, above-threshold illuminations and repeated flashes. P. P.

612.843.5

546. Computation of the effective intensity of flashing lights.

C. A. DOUGLAS, *Illum. Engng.*, **52**, 641-646 (*Dec.*, 1957).

The effective intensity of a flashing light of non-square waveform can be computed by a number of equations, one of which is an integral solution originally proposed by Blondel and Rey. A technique for determining the limits of flash time within which to perform the integration is developed, based on the requirement that the effective intensity obtained from the integration is a maximum. The technique is applied to complex intensity-time curves and to groups of short flashes. P. P.

535.1

547. On the development of our conception of light.

H. KORTE, *Lichttechnik*, **9**, 591-593 (*Dec.*, 1957). *In German.*

The nature of light was a subject of speculation at least from the time of Euclid and Aristotle. Advances were made by Kepler and by Galileo, who was the first to attempt to measure its velocity. Fermat enunciated his principle that light always takes the quickest path from one point to another. Grimaldi was the first to observe diffraction bands and then came Huyghens who, following a suggestion made by Hooke, developed the wave-theory which was unfortunately rejected by Newton. The discovery of polarization by Bartholinus, the measurement of the velocity by Römer, and Young's demonstration of interference all contributed to the triumph of the wave theory, culminating in the work of Faraday, Maxwell and Hertz. Michelson's experiments prepared the way for the development of the quantum theory. J. W. T. W.

LAMPS AND FITTINGS

548. Uses of new mercury lamps. 621.327.534

D. R. PHILLIPS and E. C. MARTT, *Illum. Engng.*, **52**, 519-526 (*Oct.*, 1957).

A jacketless mercury arc lamp with a tubular quartz envelope has been developed dissipating 1,500 watts in a 12-inch arc length and giving as much light per foot as the older 3,000-watt mercury arc lamp. A properly designed reflector and cover glass are required to protect the lamp from draughts; 400- and 1,000-watt colour-improved reflector mercury lamps have also been developed, and installations of these employing entirely indirect lighting are found to rival in visual comfort similar installations using fluorescent lamps. P. P.

621.327.534.15

549. A study of the extraction of heat from fluorescent luminaries in air cooled rooms.

W. STURROCK and L. F. SCHUTRUM, *Illum. Engng.*, **52**, 569-574 (*Nov.*, 1957).

A full-scale test room belonging to the American Society of Heating and Air Conditioning Engineers has been used to measure the cooling loads required to dissipate the heat generated by totally direct and totally indirect fluorescent lighting installations giving 180 and 80 lm/ft^2 respectively. Both cool air ventilation and a system employing cold water circulating through ceiling panels were studied. Experimental details are described, and results are given for three ceiling panel temperatures, three supply air temperatures and two rates of air change. P. P.

621.327.534.15

550. Design and characteristics of fluorescent lamps having a non-circular cross section.

J. O. AICHER and E. LEMMERS, *Illum. Engng.*, **52**, 579-584 (*Nov.*, 1957).

To meet the demand for fluorescent lamps of greater lumen output than those at present commonly used, while at the same time maintaining their overall dimensions and

high luminous efficiency, attention has been given to the redesign of the lamp tube section. The conflicting requirements of a large tube to carry the necessary higher wattage and a small tube to do this without loss of efficiency has been met with a U-shaped section and with "power" grooves in a tube of otherwise circular cross-section.

P. P.

621.327.534.15

551. Application of non-circular cross-section fluorescent lamps.

G. R. Baumgartner, R. T. Dorsey and E. A. Linsday, *Illum. Engng.*, **52,** 587-596 (*Nov.*, 1957).

High output fluorescent lamps of non-circular cross-section ("power groove" lamps) require for their precise photometric specification measurements of luminance and candlepower which are more detailed than are those for the more conventional circular cross-section lamps. The higher dissipation of energy per unit length of these lamps means that air velocity and ambient temperature become particularly critical. Applications of these lamps to industrial buildings, stores, offices and schools and to exterior lighting are described.

P. P.

621.327.4

552. Present aspects of the utilisation of cold-cathode discharge tubes as sources of light.

E. Gomonet, *Bull. Soc. Franç. Elect.*, 7th Series, **7,** 630 (*Oct.*, 1957). *In French.*

Describes briefly modern developments of cathodes for cold-cathode tubes, including the "double steatite" electrode, activated iron electrodes and activated molybdenum electrodes for which it is claimed that the electrode loss is a smaller fraction of the tube watts than is found in hot-cathode lamps. The gas filling, the fluorescent coating and the forming of the tube are briefly described. Mechanical forming of tubes is now possible, giving greater precision and less cost than hand forming and permitting the use of tube sizes not amenable to hand forming. Possible uses of these tubes, not in the opinion of the author fully exploited, are discussed.

J. M. W.

LIGHTING

553. Visibility on the road. 628.971.6

A. J. Harris, *Trans. Illum. Eng. Soc.* (*London*), **22,** 243-260 (*No.* 9, 1957).

Existing methods of measuring the visibility of an object or assessing the visibility in an installation are discussed and a distinction is made between the two. The concept of visibility is analysed to show the difficulties involved, namely the correct scale of visibility to use and the interpretation of numerical values resulting. It is concluded that no useful meaning can be attached to a single number used to represent visibility since cases, often where guidance is most needed, arise in which the comparison breaks down. It is considered, however, that the visual safety of an installation can be represented by a single number. The difficulties of this are discussed and it is pointed out further progress depends on the further clarification of the part played by visibility in accident causation so that it can be represented in numerical terms.

W. R.

628.97

554. The theory of visual judgments in motion and its application to the design of landing aids for aircraft.

E. S. Calvert, *Trans. Illum. Eng. Soc.* (*London*), **22,** 271-287 (*No.* 10, 1957).

Brings up to date the theory of visual landing aids and discusses practical methods of increasing landing safety. Concludes that guidance in the vertical plane needs to be improved and describes a new form of angle of approach indicator which promises success in this. It is considered that beam spreads of approach lights should be increased and fittings for providing guidance for circling approaches should be developed. The British design of flush-type runway light has proved successful and as a result landing mats have now become practicable even on existing runways.

W. R.

628.97

555. The lighting of the Théâtre Louis XV at Versailles.

G. Leblanc, *Lux*, **25,** 72 (*July-Sept.*, 1957). *In French.*

Describes the special stage and auditorium lighting in the reconstructed opera house at Versailles. The stage lighting control is unusual, in that it uses and is linked with the control equipment used for the Spectacles de Son et Lumière. This equipment, already provided with remote control from various sites, can also be controlled from the stage position and provides 100 controlled circuits to the opera house. The remote control provides for the operation of the master colour dimmers and for the Grand Master. There are also master control positions at the prompter's box, where the lighting controller is also seated, and at a rehearsal position located in one of the stall boxes. A further series of 100 circuits has been installed in the opera house using thyratron dimmers operated by miniature levers.

J. M. W.

556. Experience with high level office lighting. 628.972

J. M. Ketch and *W. S.* Fisher, *Illum. Engng.*, **52,** 529-534 (*Oct.*, 1957).

To gain experience in working under high levels of artificial illumination two offices have been relighted to these higher levels by fluorescent lamps. In one office a single level of 200 lm/ft² (average) was provided while in the other office a variable level with a maximum of 400 lm/ft² (average) was provided. For continuous working the highest available illumination level in each installation was preferred. Room and work surface reflectances considered satisfactory at 50-100 lm/ft² were found to be equally satisfactory at these higher levels. Glare by reflection from glossy photographs, etc., was found to create a problem in both installations.

P. P.

557. Accident prevention and public lighting 628.971.6

P Borel, *Bull. Assoc. Suisse Elect.*, **49,** 8-11 (*Jan.* 4, 1958). *In French.*

The author, who is attached to the Swiss organization for the prevention of accidents, examines the evidence adduced by authors in various countries to show that improved street lighting reduces the incidence of night accidents. He gives the results of a survey of accidents in Switzerland, showing that one-third occur at night in spite of the fact that night traffic is only 13 per cent. of the whole; an analysis of the accident rate in certain classes of thoroughfare is also given. A comparison of the actual number of accidents before and after re-lighting certain thoroughfares gives inconclusive results but there is a marked decrease in the ratio of night accidents to those occurring by day. The author concludes that the installation of good street lighting results in a decrease of some 25 to 30 per cent. in the number of accidents occurring at night.

J. W. T. W.

International Lighting Vocabulary

The International Commission on Illumination is shortly to publish a 132-page Vocabulary containing 530 terms, with definitions, in English, French and German. The principal sections are: radiation, photometry, colorimetry, eye and vision, production of light, lamps, auxiliary apparatus, lighting techniques, lighting fittings and light signals. Copies of this Vocabulary can be obtained through the National Illumination Committee of Great Britain by application to Mr. L. H. McDermott, National Physical Laboratory, Teddington, Middlesex. The price per copy, if ordered before March 31, 1958, will be £1; thereafter, the price will be £1 10s.

INSTALLATIONS

There is no unusual problem in lighting a control room, but the provision of an adequate illumination on the vertical surface of the control panel without harassing reflected glare in the visual field calls for a high degree of light control and careful planning of the lighting layout. In the System Control Room of the Birmingham and District Sub-Area of the Midlands Electricity Board, this is achieved by the use of Holophane "In-Bilt" prismatic asymmetric fittings. The scheme was planned to give an average vertical surface

Control room for the Midlands Electricity Board.

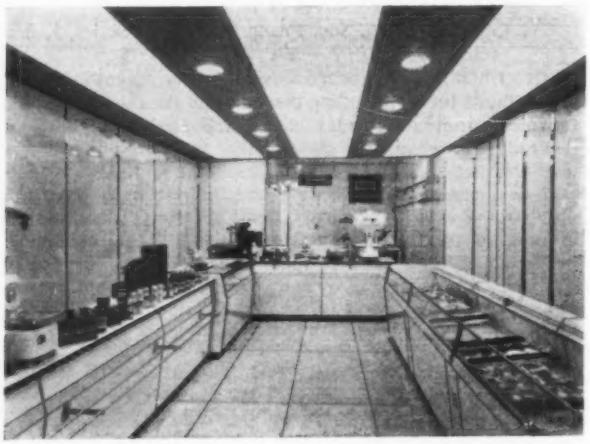
illumination of 20 lm/ft² on the diagram panels, the tops of which are only 12 inches below ceiling level. The larger of the panels is 60 ft. x 18 ft. with a pale green background. Standard "Controlens" plates with an optical system employing a 200-watt tungsten filament lamp offset in each of 30 fittings provides the required directional lighting without recourse to tilting the units. The general illumination is 20 lm/ft² and is provided by fittings recessed into a suspended ceiling which is finished in pale blue.

Installation of "Modulume" ceiling

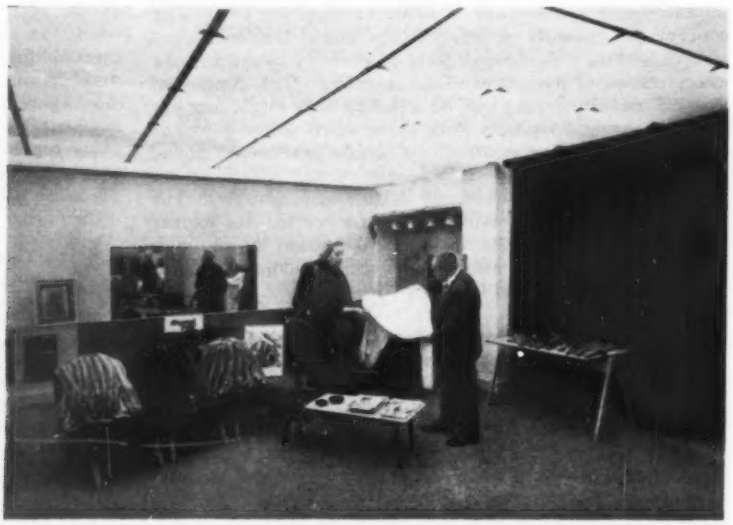
The first installation of the new Crompton "Modulume" luminous ceiling has just been completed in a showroom of Arpad Furs Ltd., 18, Grosvenor Street, W.1. The ceiling framework carrying the diffusing panels is suspended from "New Line" trunking which also supports the wiring, lamps and control gear. Rigid arched pans are used for 90 per cent. of the luminous area with a corrugated strip at each end of the ceiling to provide contrast. Colour-matching fluorescent tubes are used throughout and tungsten lamps are also installed in one section to enable furs to be examined under this form of lighting if required.

A butcher's shop

Unusual lighting for a butcher's shop has recently been installed at Mitchell's in Mercer Street, Northampton. The scheme consists of recessed fluorescent and tungsten lighting in a suspended ceiling. The main lighting is by eight 5-ft. 80-watt and eight 4-ft. 40-watt fluorescent lamps above three 25-ft. by 3-ft. lumenated panels. Deluxe Warm White fluorescent instant-start lamps have been used of the type with an external water repellant silicone coating. Sixteen additional 150-watt tungsten lamps are used, 12 in recessed



Mitchell's, Northampton.



"Modulume" ceiling in a fur showroom.

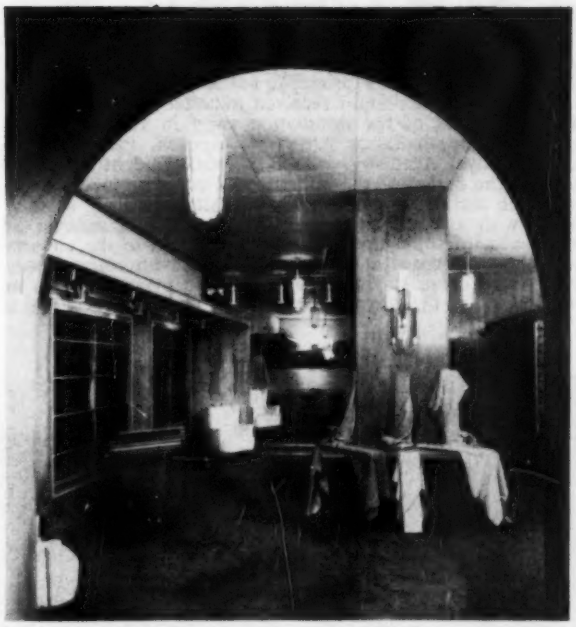
fittings in the Burgess Ceiling Tiles and four reflector spotlights in "Cupola" swivel fittings. The lighting equipment was supplied by the AEI Lamp and Lighting Co. Ltd. and installed by F. Mitton and Son Ltd., Northampton.

Bourne and Hollingsworth, Oxford Street

Distinctive lighting is playing an important part in creating a "new look" in keeping with the new techniques in selling, display layout and control now being applied at the Oxford Street store of Bourne and Hollingsworth Ltd.

The attention of prospective purchasers is captured first by the display windows where the lighting system, designed by the GEC, incorporates a combination of 125-watt colour corrected mercury lamps, 150-watt silvered spotlights and background lighting from coloured fluorescent tubes mounted at ceiling and floor levels.

The attractive effects of the new-style decor and layout of the ground sales floor are an open invitation to buy. Designed by Copeland Novak and Israel of New York and installed by Harris and Sheldon Ltd., it enables goods of all types from wools, men's wear and umbrellas, to jewellery and cosmetics to be shown off to their best advantage in a colourful, functional setting. The lighting fittings were specially made by the GEC to Bourne and Hollingsworth's requirements to merge with the decor. General lighting is provided by square shape fittings each housing three 4-ft. white tubes and three 4-ft. deluxe warm white tubes. The fittings, which are finished in white to match the ceiling, have metal louvres underneath and there is no upward illumination. The light from the tubes blended with the light from supplementary tungsten fittings, which can be angled to act as spotlights for special displays, produces accurate colour rendering and an even level of warm coloured illumination which is acceptable by the customers and staff. The electrical installation was carried out by Barlow Bros. Ltd.



Kilgour, French & Stanbury, Dover Street.

Tailors in Dover Street

The tailoring establishment of Kilgour, French & Stanbury Ltd. in Dover Street has recently been redesigned by G. Ramon. The lighting was carried out by Troughton & Young (Lighting), Ltd., and consists of special fittings, of four different types. The decorative chandeliers were specially made with parchment shades and polished brass-finish metal work. The fittings by the shelves are designed to throw the light on to the lengths of cloth and yet retain the subdued atmosphere of the showroom. Special cylindrical fittings were used for the window display to provide a punch of light on textiles in the window, without giving too much general lighting.

Bourne and Hollingsworth, Oxford Street.

Street Lighting at Ampthill

An extension to the fluorescent street-lighting at Ampthill, in Bedfordshire, will be made during the spring, by which time all the principal roads in the town will be lighted. The installation received national publicity during the first stages of the installation early in 1957 following objections by Professor Albert Richardson, Past-President of the Royal Academy, who is a local resident and considered the design of the lanterns and columns incongruous with the architecture of the town. Although only a small town with a population of 3,000, Ampthill is situated at the centre of some of the largest brickfields in the country and the cross roads at the centre of the town consequently carry very dense traffic at peak hours. In many places in the centre of the town the roads are very narrow, with a

width of less than 20ft., and the installation provides a much higher than standard level of illumination. Installation of the first lanterns was completed in October. This phase of the scheme consisted of 25 points. AEI "Diadem" fluorescent lanterns have been used, mounted at 25ft. on AEI spun concrete "Trifoil" columns. The lanterns each contain two 5-ft. "Warm White" fluorescent lamps controlled by instant-start gear.

Shopping Precinct at Coventry

The first part of the lighting of the shopping precinct at Smithfield Way, Coventry, has just been completed. The lanterns used are Revo post-top fittings with 80-watt mercury fluorescent lamps; the columns are Revo "Slender-line," which incorporate an underground cast-iron box housing the control gear, time switch, etc. The architect for the

precinct is Arthur Ling, City Architect and Planning Officer; Granville Berry, City Engineer and Surveyor, was responsible for the design of the lighting scheme.

NEW PRODUCTS

Range of fluorescent fittings

A new "101" range of fluorescent lighting fittings now being marketed by The General Electric Co. Ltd. is based on a rigid, precision-made channel to which complete assemblies are attached. The designs avoid the use of a multitude of small parts, and as a result maintenance time is kept to a minimum.

To achieve standardisation, new tube-holders have been designed for use throughout the range. All Osram tubes up to 5 ft. used in the new range are fitted with bi-pin caps and new recessed double-contact (RDC) caps are fitted to Osram 8-ft. tubes. Both single and twin types of holders have identical means of fixing, and the use of the retracting principle allows even the longer tubes to be fitted and removed from one ladder position. The dimensions of the holders have been kept to a minimum so that they present a neat appearance when they are visible, and the new design also reduces the darkened appearance of enclosed fittings which is apparent when BC holders are used.

The basic channel for the "101" fittings is of steel with die-cast ends. It is pre-treated for resistance to rust, and is finished in white stove-enamel. An alternative "super" finish can be supplied for fittings to be installed in locations where corrosive elements prevail. The 8-ft. patterns are fitted with retractable holders at each end, but all other sizes are fitted with one retractable and one fixed holder at each end.

Switchless or switch-circuts are available with 3-ft., 4-ft., 5-ft., and 8-ft. units, but the 1½-ft. and 2-ft. sizes are for switch-circuit only. The control gear is locked on to the backplate, with which it is in full thermal contact. Internal wiring is secured by special insulated cleats and a fused mains terminal block is provided for incoming cables.

The basic channel is equipped with various means of fixing:—

(a) A series of ½-in. knockouts is provided for use with either conduit suspensions, or hooks attached to chains. Two

(continued on page 128)

How will you see tomorrow?

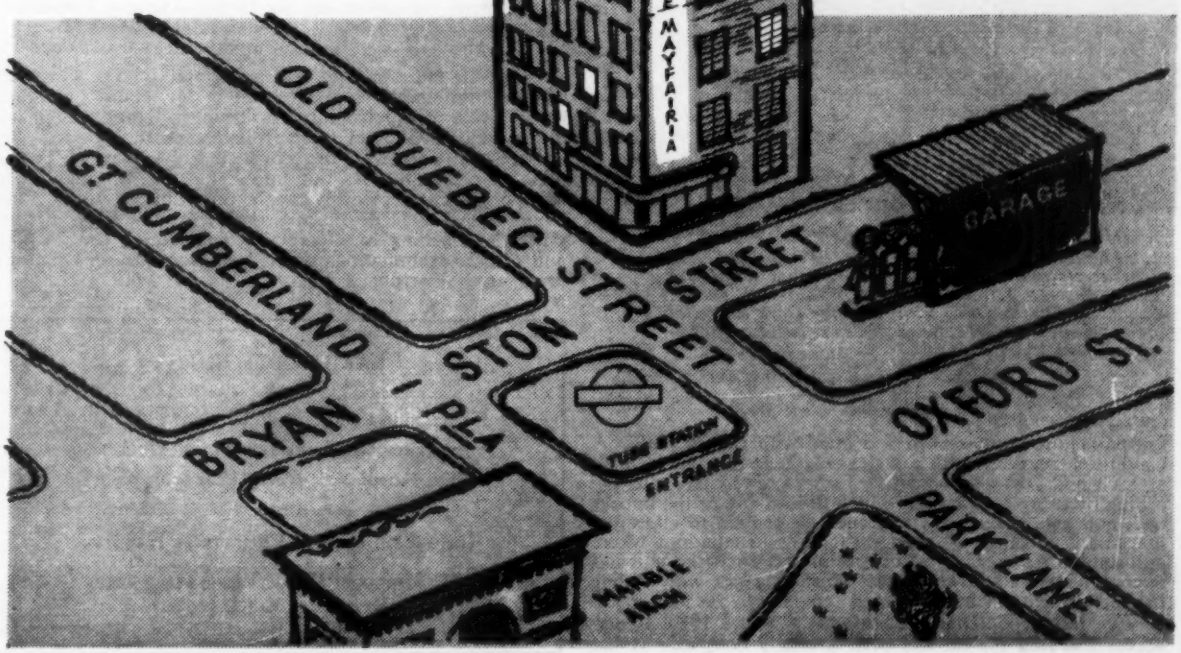
COME TO THE I.C.I. LIGHTING EXHIBITION AT THE MAYFAIRIA ROOMS, BRYANSTON STREET, W.1 AND SEE FOR YOURSELF

FROM MARCH 25th – 29th I.C.I. are holding a Lighting Exhibition at the Mayfairia Rooms, Bryanston Street, W.1. They will show the use of 'Perspex', 'Darvic' and other I.C.I. plastic materials in the design of every form of modern lighting — for streets, public buildings, homes and industry. Be sure to come and see it – you will be very welcome.

The Mayfairia

HOW TO GET THERE

...by Bus:- Nos. 6, 7, 8, 12, 13, 15, 17, 23, 60, 63, 73, 88, 113, 137.
night services:- 289, 291, 294, to Marble Arch.
...by Green Line:- 703, 706, 707, 708, 712, 713, 714, 716, 717, 718, to Marble Arch.
...by Tube:- Central Line direct to Marble Arch Station.
...by Car, Ample Parking space all round the Mayfairia and large garage opposite.



'Perspex' and 'Darvic' are registered trade marks the property of I.C.I.

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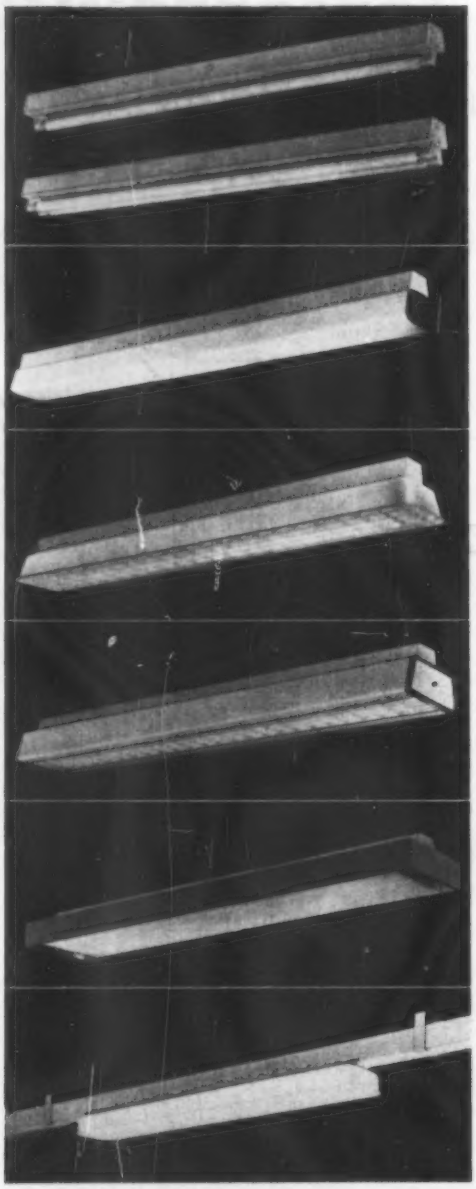
IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON · S.W.1



A selection of the GEC "101" range: 1, the basic channel; 2, enclosed reeded 'Perspex' diffuser; 3, white stove-enamelled louvre with 'Perspex' or pressed steel reflector; 4, reeded 'Perspex' sides with louvre; 5, glazed diffuser fitting with blue-grey stove enamelled frame; 6 pressed steel stove enamelled reflector on under-access trunking.

(continued from page 126)

knockouts are ready-drilled and fitted with rubber plugs. A conduit entry, fitted with a white polythene plug is provided at each end. (b) The channel can be screwed direct to the ceiling by using cup-washers which fit into any of the knock-outs and give a generous tolerance on centres to allow for inaccurate plugging of ceilings. (c) For installations where adjustable or non-standard centres are required the unit has a continuous rail arrangement which engages with sliding hangers which can be purchased separately.

For large industrial installations a new "101" under-access trunking system has been specially designed. It has the usual features for cable runs, with gear trays which lock neatly into position, and the method of attaching reflectors is identical with that for the "101" range of lighting fittings, thereby enabling standard "101" reflectors to be used. This trunking can either be suspended from sliding hangers, or mounted direct to a ceiling. It is normally finished in "duck-egg" blue with white cover-plates and white reflectors.

The "101" range fittings can also be attached in any position along GEC cable trunking.

Correspondence

Courses in Illuminating Engineering

Dear Sir,—In the February, 1958, issue of *Light and Lighting* you stated that the Borough Polytechnic had taken over the teaching of Illuminating Engineering from the Northampton College of Advanced Technology, and regretted that such a subject was apparently not worthy of an advanced technological course.

I would like to make it quite clear that we have been teaching Illuminating Engineering at the Intermediate and Final levels at the Borough Polytechnic since the inception of the City and Guilds examinations in this subject. I think that we can claim some success in this direction, and in support of this one of our students obtained the Silver Medal at the Final level in 1957.

We also offer courses in the subject for the Part III examination of the I.E.E. and the National Council for Technological Awards has approved courses at this Polytechnic leading to the Diploma in Technology in both Electrical Engineering and in Physics. It is a widely held fallacy that work of such high calibre is now restricted to designated "Colleges of Advanced Technology."

I quite agree that Illuminating Engineering, together with its supporting sciences and technologies, could well develop into a worthy subject of an advanced technological course, and we, at this Polytechnic, would be happy to further this aim. In this connection, industry could co-operate by providing the latest technical information and data, and, what is of equal importance, by making available lighting equipment and apparatus to enable demonstrations and laboratory experiments to be presented in the most effective manner. It also seems desirable that industry and educational establishments should co-operate by the formation of a joint consultative committee and by including one or more representatives of Education on the British Lighting Council.

Borough Polytechnic, London. J. E. GARSIDE, *Principal.*

The reference in the first paragraph of Dr. Garside's letter is presumably to a statement in Mr. Penny's Random Review that "responsibility for training lighting engineers in the fundamentals of their profession in the London area now rests mainly with the Borough Polytechnic." This is quite true, but it does not imply that the Borough Polytechnic has not previously taught this subject. Indeed, had it not been for "The Borough" and the late C. E. Greenslade the teaching of illuminaing engineering for the City and Guilds examinations might have come to an end some years ago.—EDITOR.

Book Reviews

"The Measurement of Colour," by W. D. Wright. 2nd edition. Pp. 263 + x. Figs. 83, with 8 plates, 6 in colour. Indexes. Published by Hilger and Watts, London, 1958. Price 52s.

Most readers of *Light and Lighting* will be familiar with the first edition of Prof. Wright's book, published in 1944. Since that time there has been a flood of research on colour problems. Much of this has been physiological and much of it concerned with the more intricate details of colour theory, but the basic principles of the trichromatic system have remained practically unchanged, although they are undergoing a thorough re-examination at the present time. It is not surprising, therefore, to find that, while the author has found little need to enlarge the scope of his book, no less than two-thirds of the text has been rewritten. No doubt this is partly due to some changes and a considerable degree of widening in the author's own outlook on the colour scene and partly the result of a further 13 years of experience in expounding it to his students and the senior research workers he has attracted to the Imperial College.

For those interested in the subject of colour from any point of view the book is quite indispensable. The ground covered includes not only a thorough treatment of the principles and practice of trichromatic colorimetry, and a good account of modern ideas regarding the visual process, but there is also a chapter on the subjective aspects of colour and the construction and use of a colour atlas. The last two chapters deal respectively with the application of colour-mixture data to three-colour reproduction (including colour television) and with practical applications of colorimetry in various industries, in lighting and in meteorology and astronomy.

The standard of production is high and the book is remarkably free from errors, though, strangely enough, in plate 4, the coloured patches decrease in saturation from above downwards, while in the accompanying curves this order is reversed. There are nine pages of tables giving the data needed in practical colorimetry on the C.I.E. system.

J. W. T. W.

"Contact Lens Routine and Practice," by Norman Bier, F.B.O.A., D.Orth. Pp. 264; Figs. 177. London, Butterworths Scientific Publications, 1957. Price 50s.

This book, by a well-known contact lens practitioner, is an able treatise on the procedures involved in equipping patients with one or other of the several varieties of contact lens which the author deals with in detail. It is stated that with contact lens patients are usually more subject to glare, bright lights and surface reflections than with spectacles. One of the reasons for this is that the thin plastic substance of the contact lens transmits more light than does a spectacle lens, but it may also be that more light is collected by an eye fitted with a contact lens owing to the slight protrusion of the lens. However, the lens can be tinted if required. To those who are not concerned with lighting alone, but also with the correcting of errors of refraction by the least conspicuous means, this book will be most informative.

H. C. W.

"The Reproduction of Colour," by R. W. G. Hunt. Pp. 208; Figs. 87 and 11 colour plates. Published by Fountain Press, London, 1957 Price 63s.

In this book Dr. Hunt has adopted the quite commendable plan of giving, in the first seven chapters, a more or less descriptive account of his subject, an account which should be readily comprehensible by the reader not versed in mathematical theory. In the other seven chapters, which are rather longer, there is a precise treatment of the many problems met with in colour photography, colour printing, colour television and the like, and here, although the reader is spared nothing essential to the argument, the author's explanations are clear and the approach eminently practical.

The book is surprisingly up-to-date, a very important matter in a subject where both theory and practice are developing rapidly. Each chapter is provided with a selected bibliography and there is a good index. The standard of production is remarkably high. Printer's errors are almost absent, and the printing, paper and setting-out are good. The colour plates call for special mention; it is evident that nothing has been spared to make them as perfect as possible, and the results are of a remarkably high standard. Professor W. D. Wright contributes an appreciative Foreword to a book of which author and publishers may well be proud.

J. W. T. W.

Situations

Vacant

LIGHTING ENGINEER with planning and contact experience required for Manchester office of Ekco-Ensign Electric Ltd. Apply Manager, Blackett Street, Fairfield Street, Manchester 12.

SALES ENGINEER for Marine Navigational Lighting Equipment. Age about 25-35. Previous experience in this particular field of lighting not essential but the appointment, which is based on London, will be concluded with one who has enthusiasm as well as personality and a thorough basic electrical knowledge and aptitude for electric lighting installations with their associated mechanical aspects. Training will be given initially in the application of our equipment to ports, harbours and waterways all over the world; subsequent duties will consist of travel, both in the United Kingdom and overseas for several months in the year, and the formulation of suitable schemes for customers. Write, stating salary required, to Box No. 582.

SALES REPRESENTATIVE required for Industrial and Domestic Lighting Fittings produced from "Perspex" and other Plastic materials. Existing contacts essential. Good prospects. Thermo-Plastics Ltd., Dunstable, Beds.

ASSISTANT SALES MANAGER required for Lighting Fitting Division. Pension scheme. Salary commensurate with ability. Apply: Thermo-Plastics Limited, Luton Road Works, Dunstable, Beds.

I.E.S. ACTIVITIES

Leicester Centre

The speaker at the Leicester Centre meeting on January 27 was Mr. P. H. Collins, who spoke about modern applications of plastics to lighting fittings. He explained that present-day technique included extrusion and injection moulding which was meeting the exacting requirements of modern lighting. Mr. Collins went on to explain that modern lighting equipment had to meet severe and varied conditions such as extreme temperatures, humid-, acid- and vapour-laden atmospheres, as well as give optical and scientific control of light. It follows, therefore, that chemists are compelled to meet these requirements more accurately than when dealing with plastics for decorative and aesthetic purposes.

Manchester Centre

The Manchester Centre had the very pleasant experience on January 16 in welcoming back one of its old members, Mr. Harry Hewitt, who gave an interesting and controversial paper on the use of coloured light.

Mr. Hewitt advocated the greater use of coloured light for domestic interiors. He doubted whether apparent colour distortion is as important as had been accepted in the past; in fact he suggested the theory of coloured light could be taken a stage further and the illusion of heat and warmth could be created in the winter season and coolness in the summer.

Amongst Mr. Hewitt's demonstrations was one of the flattering characteristics of the pink light as compared with the standard GLS lamp. The demonstration was, perhaps, not quite as convincing as it could have been, in view of the fact that Mr. Hewitt's model would have looked attractive in any light and although the members of the Society were undoubtedly in a scientific frame of mind, they could, perhaps, be forgiven if their thoughts strayed to more artistic appreciation.

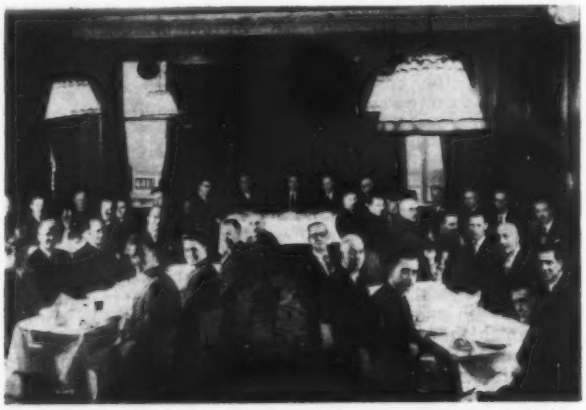
Following Mr. Hewitt's talk an interesting discussion took place. The Manchester Centre is arranging to present a series of lectures at schools in Manchester and district. At the present time the lecturing panel consists of a few people drawn from the Centre Committee, and the wish is that more people should take part in the presentation of these lectures. If any member is willing to undertake a lecture, or assist at one of the lectures, would he please advise the Hon. Assistant Secretary.

The Centre Committee is now considering its programme of events for the Society's Jubilee in 1959. Happenings within the Centre will be part of nation-wide celebrations and it is hoped that the celebrations organised in the Centre will compare favourably with those elsewhere. Many ideas have been put forward as to activities which might be promoted, but other ideas would be welcomed. If any member feels that he has a useful suggestion to make, or feels that he would like to join the sub-committee dealing with the preparations, would he please advise the Hon. Secretary or Hon. Assistant Secretary.

Cardiff Centre

The annual Dinner and Dance of the Cardiff Centre was held on January 3 at the St. Mellons County Club. The guests included the President and Mrs. Sawyer, Mr. G. E. Smith, chief commercial officer of the South Wales Electricity Board, and Mrs. Smith, Mr. R. H. Hill, chairman of the Bath and Bristol Centre and Mrs. Hill, Mr. H. A. Partridge, assistant district manager of the General Electric Company and Mrs. Partridge and Mr. D. B. Francis, chairman of the Swansea Group. The toast to the society was proposed by the chairman, Mr. M. E. McCann to which Mr. E. B. Sawyer replied. The function was a great social

At the annual dinner of the Birmingham Centre; (left to right) Mr. V. A. Heydon, Mr. C. C. Smith (vice-president), Mr. G. E. Kemp (chairman), the deputy Mayor of Birmingham and Mr. L. E. Gibbs.



Members and visitors at a recent luncheon meeting of the Glasgow Centre.

The President and Mrs. Sawyer and Mr. and Mrs. M. E. McCann at the annual dinner and dance of the Cardiff Centre.

success and it was only with difficulty that all applications for tickets were honoured.

Birmingham Centre

"Eyesight is industry's most useful tool. It is so flexible in its many uses that it will function somehow, even in extremely adverse circumstances, thus resulting in gross abuse." So said Mr. M. L. Berson, F.B.O.A. (Hons.) in the course of his paper "Prescribing for Seeing" to the Birmingham Centre on January 31. The gathering of well known local professional people and others visiting the Centre included representatives from the British Optical Association, the Association of Industrial Medical Officers and the Industrial Safety Group of the Factory Inspectorate in particular.

Mr. Berson discussed the act of seeing by dividing it into three separate departments, namely, the visual mechanism, the visual field, and the illumination of the visual field. He described the type of standards required, in order to provide a satisfactory basis for diagnosis and eventual treatment and cure. The ideal was to correct eyes before they were incapacitated, but if this was not possible, then correction had to be attempted. The important thing was to determine the capabilities of the eyes, and just how they became defective. The lecturer strongly urged that the managements of works and factories should invite opticians in to see the type of work being done, and arrange for the periodic testing of the eyes of workers. Opticians, he said, should have first hand knowledge of lighting.

Mr. Berson also dealt with the correct type of lighting for television viewing, and glare from vehicle headlamps. A most interesting and detailed film emphasised all the points Mr. Berson had made.

Mr. C. Green, chairman of the Midland Division of the British Optical Association, opened the discussion by dealing with the question of absorption and tinted glasses, and in the general discussion that followed, questions ranged from the field of vision to the lighting of highways by sodium or mercury lamps for seeing without strain to the eyes.

FORTHCOMING EVENTS

LONDON

March 11th

Sessional Meeting.—"Lighting and Safety in Building Operations and Works of Engineering Construction," by J. Gordon Scott. (At the Lighting Service Bureau, 2, Savoy Hill, W.C.2.) 6 p.m.

April 1st

Conference on Factory Lighting. (At the Northampton College of Advanced Technology, St. John Street, E.C.1)

April 15th

Sessional Meeting.—"Characteristics and Applications of Photo-electric Cells," by F. A. Benson. (At the Federation of British Industries, 21, Tothill Street, S.W.1.) 6 p.m.

May 11th-14th

Summer Meeting at Eastbourne.

CENTRES AND GROUPS

March 4th

STOKE-ON-TRENT.—"Blackpool Illuminations," by H. Carpenter. (At the North Stafford Hotel.) 6 p.m.

March 5th

EDINBURGH.—"Open Space Lighting," by M. W. Peirce and H. F. Stephenson. (At the Y.M.C.A. Social Room, 14, South St. Andrew Street, Edinburgh.) 6.15 p.m.

NEWCASTLE-UPON-TYNE.—"Colour Matching Problems," by A. Wilcock. (At the Large Lecture Theatre, Grey Hall, Department of Electrical Engineering, King's College, College Road, Newcastle-upon-Tyne, 1.) 6.15 p.m.

March 6th

CARDIFF.—"The Architect's Approach to Lighting," by G. Grenfell Baines. (At the Demonstration Theatre, South Wales Electricity Board, The Hayes, Cardiff.) 6 p.m.

GLASGOW.—Annual General Meeting. "Open Space Lighting," by M. W. Peirce and H. F. Stephenson. (At the Lighting Service Bureau of Scotland, 29, St. Vincent Place, Glasgow, C.1.) 6.30 p.m.

NOTTINGHAM.—"The History of Mine Lamps," by Miss H. M. Maurice. (At the Demonstration Theatre, East Midlands Electricity Board, Smithy Row, Nottingham.) 6 p.m. Refreshments 5.30 p.m.

March 10th

SHEFFIELD.—"Lighting Research at the Building Research Station," by R. G. Hopkinson. (At The Grand Hotel, Sheffield.) 6.30 p.m.

March 17th

BATH AND BRISTOL.—"Decorative Lighting—A Designer's Approach," by D. W. Durrant. (At Gardiner Sons and Co., Ltd., Broad Plain, Bristol, 2.) 6.15 p.m. Refreshments 5.45 p.m.

March 18th

LIVERPOOL.—"Light as an Effective Aid to Architecture," by H. R. Ruff, R. V. Mills and H. E. Bellchambers. (At the Committee Rooms of the Liverpool Passenger Transport Office, 24, Hatton Garden, Liverpool, 3.) 6 p.m.

March 19th

NORTH LANCASHIRE.—Annual General Meeting. "The Design and Application of Flameproof Lighting Equipment," by D. A. Strachan. (At the Demonstration Theatre of the North Western Electricity Board, 19, Friargate, Preston.) 7.15 p.m.

TEES-SIDE.—"The Lighting Laboratory," by G. Mainwaring. (At the Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough.) 6.30 p.m

March 20th

MANCHESTER.—"An Architect's Views on Lighting," by J. R. Sheridan. (At the Demonstration Theatre, North Western Electricity Board, Town Hall, Manchester, 2.) 6 p.m. Light Refreshments from 5.30 p.m.

March 24th

LEEDS.—"Street Lighting in Leeds and Remote Control Systems," by K. J. Goddard and T. C. Holdsworth. (At the Lighting Service Bureau, 24, Aire Street, Leeds, 1.) 6.15 p.m. Refreshments from 5.30 p.m.

LEICESTER.—"Television Studio Lighting Equipment," by K. R. Ackerman. (At the Demonstration Theatre, East Midlands Electricity Board, Charles Street, Leicester, entrance Rutland Street.) 7 p.m.

March 25th

GLOUCESTER AND CHELTENHAM.—"The New Approach to Interior Lighting Design," by J. M. Waldram. (At the Fleece Hotel, Westgate Street, Gloucester.) 6.30 p.m.

LEEDS.—Annual General Meeting of Hull Section. (At the Yorkshire Electricity Board, Ferensway, Hull.) 6.30 p.m. Refreshments from 6 p.m.

March 28th

BATH AND BRISTOL.—Annual Dinner Dance. (At the Hawthorns Hotel, Bristol.)

BIRMINGHAM.—"Lighting in Relation to Modern Ceilings and Roofs," by Derek Phillips. (At Regent House, St. Phillip's Place, Colmore Row, Birmingham.) 6 p.m.

POSTSCRIPT By 'Lumeritas'

EARLY this month is being celebrated the centenary of Siemens Brothers—that pioneer company of the electrical industry whose name and products are well-known the world over, and which is known to readers of this journal more particularly as a leading manufacturer of lamps and lighting equipment. The outstanding personality in the centenary celebrations is, of course, Dr. J. N. Aldington, the present head of the Siemens Edison Swan organisation. It must surely be gratifying to many people in "the lighting world" that one who has made his name largely by his contributions to the development of modern electric lamps should now be "the leading light" guiding the affairs of this great company, which are as much concerned with cables, telephone equipment and other electrical products as with lamps and their accessories. As part of the present celebrations, Dr. Aldington is giving a centenary lecture entitled "100 Years of Electrical Engineering," which I believe will be accompanied by some remarkable demonstrations. The lecture is being delivered on March 5 at the Central Hall, Westminster, before a large invited audience. No one who has heard one of Dr. Aldington's public lectures, or any of the papers he gave to the IES both before and during his presidency of that society in 1949, will doubt that his audience will find this occasion one of absorbing interest.

THE first use of the self-excited dynamo generator which William Siemens developed was to produce electric light, and more than 80 years ago lighting installations utilising arc-lamps were equipped by the Siemens Company. One of the most notable of these installations was that at the Royal Exchange, where the height of the lamp column was much greater than is now standard practice on class A roads. The generator had to be in the vicinity of the installation, since the development of power cables for the distribution of electricity had not then occurred, though, of course, the production of telegraph cables was the business of the company from its inception in 1858. The company were active in the development and manufacture of filament lamps more than 50 years ago, and I find that in very early issues of this journal they were advertising "Tantalum" lamps for all voltages from 20 to 250, and candle-powers from five to 50. The price of a 16 c.-p. 140-160-volt lamp was 2s. and, remembering the theme of last month's Editorial—"Cheap and Good," it may be emphasised here that more powerful gas-filled tungsten lamps can now be bought for the same price, notwithstanding the unfortunate fact that 2s. to-day is worth no more than about 6d. was 50 years ago!

The history of the Siemens Company is very largely the history of the development of electrical engineering, which is the theme of Dr. Aldington's lecture I have already mentioned. It is interesting to note that I. D. Scott, one of the historians of the late war, has commemorated the centenary by writing the company's history in a volume entitled "Siemens Brothers, 1858-1958, An Essay on the History of Industry." I hope this example will stimulate other great companies to open their records to the impartial historian, for there is much to be learnt from well-ordered and unprejudiced accounts of the growth of such enterprises.

THREE weeks ago there occurred the centenary of something very different, namely, the first apparition to St. Bernadette in the grotto of the Virgin Mary at Lourdes. Many thousands of sick persons have made the pilgrimage to Lourdes in the hope of miraculous cure, but it seems that only a small percentage of claimed cures have eventually been accepted as authentic cures by the ecclesiastical authorities who investigate them. About 6,000,000 people are expected to visit Lourdes during this centenary year, and the great event of the year is the opening this month of a huge oval underground basilica which has been built to accommodate 20,000 people. The lighting is, of course, entirely artificial and the ceiling represents a starry sky.

WRITING to the Editor last month a correspondent revived the apparently futile topic of a proper name for the "lumen per square foot." Some years ago he suggested the name "luft" which—despite the fact that it is almost self-explanatory—I thought had little chance of winning approval because it is so suggestive of the erstwhile German air force. I have not changed my view but, an eminent supporter of "luft" having been found, the originator has been encouraged to renew his suggestion. It was originally rejected, he says, "for the sole and rather feeble reason" I have mentioned above. Although it does not commend itself to me for this reason, it has not been generally rejected but merely neglected—as every other suggested name has been. The truth seems to be that most of the people who might be supposed to have an interest in a neat name for the unit of illumination in "non-metric" countries really couldn't care less about it. This being so, nothing is likely to come of any further suggestions.

THIS month's snippet. Because some of the lights were not on in a railway carriage and he had difficulty in reading his newspaper, a passenger pulled the communication cord. At the local Magistrates' Court he was fined £5, with 11s. costs, for stopping the train without reasonable cause: no light price to pay for too little light!